



PROCEEDINGS

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113 West 60th Street
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wedresearch@fordham.edu

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**THE ONGOING ROLE OF DR. W. EDWARDS DEMING
IN SERIOUS BUSINESS THINKING AND PRACTICES:
Prominent Authors Call for Return to Deming**

Kelly L. Allan
Senior Associate
Kelly Allan Associates, Ltd.
kallan@kellyallan.com

INTRODUCTION

When I started on this research project, I was under the impression that many of Dr. Deming's teachings had fallen into neglect. Nevertheless, I had expected to find many citations and I expected the overwhelming majority of those citations would be about Dr. Deming's approach to *quality improvement*. In fact our research uncovered dozens of authors, historians, and thought leaders who have written about Dr. Deming's *leadership and management philosophy*. Furthermore, the citations in their books and articles show the continuing influence of Dr. Deming across a variety of industries and government.

It became obvious very quickly when examining the research findings that the volume of citations was large, and we discovered that appreciation for Dr. Deming as evidenced through the citations has gone somewhat "viral."ⁱ Dr. Deming's influence on leadership can be found everywhere; from advice in books about transforming the way government departments are operated –to a book which is a thoughtful compendium of the best business books of all time.

An astonishing number of works published during the five years from January 2005 to December 2009 cite Dr. Deming and/or suggest people rediscover him. In fact, Dr. Deming's impact is attested to by the more than 258 books, 172 article citations, and hundreds of internet/blog-only references that provide evidence of Deming's influenceⁱⁱ. We classified more than 100 of the citations as referring to –or advocating aspects of—Deming's leadership/management philosophy.

To put it another way, our research indicates that Dr. W. Edwards Deming continues to have *profound* influence on business thinking, writing, and practice in the areas of leadership and management (as well as in the areas of "quality"). This influence is observed both qualitatively (via an examination of the comments made about Dr. Deming's work by highly respected business researchers and authors) and quantitatively (as defined by the sheer number of references in books, articles, and internet/blog-onlyⁱⁱⁱ citations).

Furthermore, the books (see below: 12 Books) by influential authors, thought leaders and historians call for a study of Dr. Deming's body of work and/or allude to the incomparable value of his teachings in leadership and management.

Note: We have included only citations in books and journals published in English and we have NOT included the hundreds internet-only listings we found via search engines. Further, we looked at a recent 5-year time span. The research of Dr. Joyce Orsini shows that when looking over several decades one can find several hundred operations textbooks which cite Deming. In addition Dr. Orsini's research shows that Deming's book, OUT OF THE CRISIS, has been cited more than 11,000 times since its publication.

QUALITATIVE RESEARCH FINDINGS ON DEMING: LEADERSHIP AND MANAGEMENT CITATIONS

As mentioned, one would expect to find solid evidence of Deming's influence in virtually every book about *quality improvement*. Similarly, it would not be a surprise to find that a number of books written by prominent authors who have studied Toyota cite Dr. Deming's influence on *leadership and management* at Toyota.^{iv}

But would one expect to find Deming mentioned in a book about how to achieve success in structuring, leading, and managing a department that develops leading edge software?^v (Yes, Deming is included.) Or would one expect to find Deming mentioned in a book which provides practical guidance—including leadership guidance—for young entrepreneurs, written by a very practical and successful serial entrepreneur?^{vi} (Yes, again, Deming is included.)

In our cursory review of some 258 books (and in our in-depth review of dozens of books), we found many which went beyond citations and mentions of Dr. Deming and his body of work to include a qualitative judgment about the value that has been –or could be–realized from understanding Dr. Deming’s teachings.^{vii} The following twelve books are examples which provide a flavor of what such qualitative references to Dr. Deming contain.

12 Books^{viii}.

CHASING THE RABBIT. By Steven J. Spear. 2009. McGraw-Hill.

- Spear is a four-time winner of the Shingo Prize,^{ix} a recipient of the McKinsey Award,^x and has taught at MIT and Harvard. Most interesting, perhaps is that Spear (was not employed as a consultant but) worked in many of the companies he documents in his book. It is unclear how much formal training he has had in Deming’s teachings, but it is obvious throughout the book that the management philosophy he espouses aligns very closely with Dr. Deming’s. For example, near the end of the book he writes passionately about the need to transform our thinking to do better so we are not wasting so much of our time and so many of the world’s resources. Deming made very similar comments and voiced many of the same concerns. Spear argues vigorously against the conventional wisdom of leadership practices and writes that Deming and others “confronted conventional wisdom directly, uncompromisingly, and unapologetically.” The conventional wisdom was that leaders had to manage by cost and visible numbers –a belief that was “rooted in a perverse combination of arrogance and pessimism.” Deming and others “rejected arrogant pessimism for a humble optimism . . . and [replaced it] with an energetic, open-minded commitment to discovery [that] we can always do better.” “We ignore the truth of their message at our own peril.” “We do not need conceptual, hypothetical prognostication to say that we can do better. The empirical evidence is already available and irrefutable. Certain organizations already do much more with much less than their peers and competitors can conceive. It’s not magic. What they have done, you can do.” COMMENT: Spear makes a strong case for learning from the great thought leaders and acting on what we learn. I found particularly compelling his points that there already exists enough documented evidence, irrefutable evidence, of what needs to be done. Are calls for yet more evidence typically made by people who are looking for excuses not to change how they lead?

HOW THE MIGHTY FALL. By Jim Collins. 2009. Harper-Collins.

- Collins is known for his exhaustive research, and he is one of the most quoted business thinker in the United States today. Sales of his books are legendary as is his no-nonsense disciplined thinking. In this book he points to the causes of failure; the very points that Deming made. These same points have their roots in a December 1996 *INC. Magazine* article which Collins wrote, entitled “The Classics: The complete guide to the best business and management books ever written.” Collins wrote, “Deming’s entire approach stands in stark contrast to faddishness, and I’m distressed by the number of companies that have adopted techniques and tools of the quality movement without embracing the philosophy of continuous improvement.” (COMMENT: In 1996 Collins was distressed about leaders who cherry-pick the tools and techniques they want, while ignoring the greater leverage of adopting the Deming’s New Philosophy of leadership^{xi} which Deming espoused. Such cherry-picking exists to this day.) Collins obviously knows more than a few things about Deming’s teachings, and he has keenly observed companies which have faltered or fallen as a result of following beliefs which Deming also warned against. For example, echoing Deming, Collins writes that the people who will drive improvement do not need a burning platform before they take action and that “they never take well to manipulation.” In other words, don’t wait for a crisis to transform your thinking, and don’t try to manipulate people into taking action. Instead, what you need to do is to supply the evidence showing

why action is needed, communicate the evidence in thoughtful ways, and look outside of your own beliefs and experience for knowledge of how to accomplish the change. (I am reminded of Deming's famous line, "There is no substitute for knowledge.") In *HOW THE MIGHTY FAIL* Collins is very eloquent in expressing his concerns that "hubris born of success, undisciplined pursuit of more, and denial of risk," have caused leaders to lose their way. Collins also counsels that "if you've already taken a fall... the path to recovery lies first and foremost in returning to sound management practices and rigorous strategic thinking.... It never hurts to review the classics, including Drucker, Porter, Deming and Peters/Waterman." COMMENT: It is evident that Jim Collins continues to respect Dr. Deming. The examples and suggestions in his book are compelling, and although his words are different, his advice reminds me of the advice Deming gave. Like Deming's unique contributions, Collins' own unique contributions should not be underestimated for their power to transform industry and government.

IF WE CAN PUT A MAN ON THE MOON: Getting Big Things Done in Government. By William Eggers and John O'Leary. 2009. Harvard Business Press.

- Eggers and O'Leary make a strong case that government needs to follow the lead of the best managed private enterprises. In the introduction to their book they are adamant about the importance of not blaming individuals and instead they urge readers not to be diverted from looking for "the underlying *systemic* reasons for shortcomings." They identify W. Edwards Deming as a "pioneer" who "went against the conventional wisdom." "For Deming, understanding the system was critical to fixing the source of errors." They refer to Deming's genius and talk about Deming's message in regard to complexity and the interrelated nature of processes; "Deming argued that leaders should examine a business process as a unified whole. Outcomes are generated by people working together within a system." The core message of their book is founded on the importance of systems thinking, and they seem to assume that, unlike government, the business world has learned Deming's lessons: "The business world has been through this [learning about the importance of Deming and systems thinking] already." COMMENT: I wish I could agree with the authors that the business world has learned the importance of what Deming had to offer, especially in the realm of systems thinking by leaders.

THE 100 BEST BUSINESS BOOKS OF ALL TIME: What They Say, Why They Matter, and How They Can Help You. By Jack Covert and Todd Sattersten. 2009. Penguin Publishing.

- Covert and Sattersten lead the famous company 800-CEO-READ. They read countless books each year, review them, and write summaries for their subscribers. They provide thoughtful commentary and suggestions based on their decades of reading and experience. Deming's *OUT OF THE CRISIS* makes the list of the 100 best business books, and Covert and Sattersten point out that Deming's "book gives testimony to the genius of Deming." They also include Deming's 14 Points for Management in another part of the book as meriting consideration. They quote Deming in three other "best book" selections and commentaries (pages 181, 271, 318), giving Deming credit for inspiring authors and ideas via his body of work. In fact, no other author has more citations in 100 BEST BUSINESS BOOKS than Dr. Deming.^{xii} Covert and Sattersten also categorize 11 of the best 100 books as being worthy of special attention because they have excellent "takeaways" every business person can apply "to the problems you face today." *THE TEAM HANDBOOK* by Peter Scholtes (et alia) is one of those 11 books, which advocates Deming's management philosophy. Covert and Sattersten mention that Deming's "message began to get traction in America only after his death in the early 1990s." Jack Covert says he can remember where he was in the wilds of Michigan in his motor home when NBC aired "If Japan Can . . . Why Can't We?" on June 20, 1980. "The influence of Deming's philosophy in Japan was unprecedented and continues today [2009] though he did not get this same level of appreciation in the United States." COMMENT: Our research indicates Covert is correct about the level of appreciation for Deming in the USA. In fact, the impact of Deming's teachings in regard to leadership in the USA is small in contrast to the impact of how his teachings were applied to "quality improvement." This is ironic for people who know that Deming's teachings on quality are part of a cohesive, holistic approach for sustainable success in business, in which quality is the outcome of proper management practices. Deming's New Philosophy of management, as explained in his books

and presentations, provide a pathway for leaders –a pathway that can help them transform their organizations for success that is beyond their wildest dreams.

TOYOTA CULTURE: THE HEART AND SOUL OF THE TOYOTA WAY. By Jeffrey K. Liker and Michael Hoseus. 2008. McGraw-Hill.

- Liker’s series on Toyota, which also includes THE TOYOTA WAY (2004) and TOYOTA TALENT: Developing Your People the Toyota Way (2007 with David P. Meier), makes clear Deming’s influence on Toyota. For example, the Toyoda family members, who have led Toyota, speak of the special place of importance Dr. Deming holds in the company’s past, present and future. Shoichiro Toyoda said, “Everyday I think about what he [Deming] meant to us . . . Deming is the core of our management.”^{xiii} Liker’s books are filled with Deming’s management philosophy, and he writes, “When I think about Toyota and how it operates, I keep on coming back to the quality guru W. Edwards Deming’s famous edit: ‘Constancy of purpose.’ Constancy of purpose explains why in any given year, if you bet Toyota will make a profit, you’ll probably win.” “This is ‘constancy of purpose,’ as I believe Deming envisioned it, that goes beyond short-term profits and enriching a few executives. The Toyota Way is about adding value to customers, employees, and society. It provides a framework for Toyota to make short-term and long-term decisions, and it rallies employees around a shared purpose that is bigger than any of them.”^{xiv} Toyota was affected by the world’s financial melt-down in 2008 and 2009, and the company reported its first annual loss in 2009 after a 59 year history of reporting annual profits. Akio Toyoda, President and family member, has indicated the company’s focus on constancy of purpose got a bit off track, “After ‘hubris born of success,’ ‘undisciplined pursuit of more,’ and ‘denial of risk or peril,’ Toyota is in the fourth step of ‘grasping for salvation.’^{xv} He has indicated Toyota will return to its roots, vision, and purpose. “Toyota has overcome many challenges during seven decades in business,” Akio Toyoda said. “Toyota will bounce back.”^{xvi} Liker’s books confirm the strength of the system the company has created and its resilience and ability to overcome tough challenges, and Liker aptly quotes Deming: “It is not enough to do your best; you must know what to do, and then do your best.” COMMENT: That advice will continue to be valid for Toyota as well as for all other organizations. Knowing what to do, as Collins, Spear and others have advised, depends in part on a return to studying the ways of implementing Deming’s New Philosophy of management.

HARD FACTS, DANGEROUS HALF-TRUTHS & TOTAL NONSENSE: Profiting From Evidence-Based Management. By Jeffrey Pfeffer and Robert I. Sutton. 2006. Harvard Business School Press.

- Pfeffer and Sutton are well-known for their ability to strip away the veneer of easy/convenient (and usually incorrect) beliefs of what contributes to success in business. They dig deep below the surface of conventional management beliefs to find the evidence of which management approaches really do (and don’t) create sustainable success. Dr. Deming’s management approach gets attention in HARD FACTS (as well as in Pfeffer’s and Sutton’s earlier book, THE KNOWING-DOING GAP: How Smart Companies Turn Knowledge into Action, which is included in THE 100 BEST BUSINESS BOOKS OF ALL TIME). Deming’s approach receives the attention of the authors because it meets the criteria they establish for looking at hard facts and avoiding half-truths and total nonsense. For example, the authors advise their readers to look at which management practices have stood the test of time, have been thoroughly studied, and that contribute to optimizing the overall system/organization rather than just benefiting the success of one area of a business (which in the end is very costly for the entire business). “[The current practice is to] glorify, celebrate and apply breakthrough ideas and studies,” they write. Instead, they urge their readers to “Be suspicious of breakthrough ideas and studies—they almost never happen.” Deming’s work has met Pfeffer’s and Sutton’s criteria for standing the test of time, having been rigorously studied, and for contributing to the overall success of the entire organization. They include evidence that Ford’s revival in the 1980s was based on “the management philosophy of W. Edwards Deming.” “The results . . . were stunning at Ford. After racking up \$3 billion in losses between 1979 and 1982 . . . by 1986 Ford had become the most profitable American auto company.” The authors quote a business reporter for the *New York Times*, who wrote that had Ford stuck with Total Quality Management^{xvii}, it might have avoided many of the problems that have plagued it. The authors further advise readers that, “Perhaps sticking with proven practices is boring, but we need to acknowledge—even glorify—old ideas if we want to debunk bad management practices and improve good ones. After all, isn’t bland old excellence a better fate than an exciting new failure?”

“Given all the evidence on the importance of systems, something that W. Edwards Deming and the quality movement emphasized for years, why do so many companies still place so much emphasis on getting and keeping great people and so little on building and sustaining great systems.” Proven “old ideas” have the evidence of success to recommend them. “It sounds ironic, but even creativity is mostly sparked by old ideas.” COMMENT: In other words, pay attention to Deming and others who have proven track records. Be suspicious of fads, question novel solutions which haven’t been rigorously proven, and don’t believe you are smarter than your competitors just because you are embracing the new when what really is needed is to thoroughly understand and implement the proven approaches to achieve excellence. Of course, although Deming’s approach is “old,” it is still new because so few organizations have pursued the high-leverage aspects of Deming’s leadership philosophy.

THE PURITAN GIFT: TRIUMPH, COLLAPSE AND REVIVAL OF AN AMERICAN DREAM. By Kenneth Hopper and William Hopper. 2007. I.B. Tauris & Co. Publishers.

- The Hopper brothers spent decades researching and writing this book and their attention to detail as they document the course of history is engaging. They devote an entire chapter to Deming, “Dr. Deming Rides to the Rescue – and Fails.” The authors hypothesize a few reasons why Deming failed to get leaders and boards of directors of U.S.A. companies to pay attention to a management approach that would have enabled them to compete against the high quality of imported products that were stealing their market share. For example, they write that Deming’s transformational approach was subsumed under the rubric of Quality, which meant that his essential message about a new management philosophy got skewed because leaders believed they could delegate quality to a quality department in the organizational hierarchy. Another reason they failed to rescue themselves via Deming’s teachings was that business leaders are so easily caught up in fads. During the time Deming and his New Philosophy of leadership was making progress with American companies, more than one powerful fad intruded to distract leaders from Deming’s message. One such fad (eventually proven to be mostly ineffective and even harmful –and later disavowed by its own authors) was espoused by Michael Hammer and James Champy in REENGINEERING THE CORPORATION which sold more than 2.5 million copies in the 1990s. In fact REENGINEERING THE CORPORATION “was the archetypal anti-Deming tract.”^{xviii} Within a couple years of the publication of their best-seller, however, Champy “dramatically declared that re-engineering ‘was in trouble’” and he called for more “revolution” which in the end turned out to be merely “a feeble version of the seventh of Deming’s Fourteen Points.”^{xix} This was especially ironic because Deming had Fourteen Points for management, not one. Furthermore, (and of greater irony) Deming’s Point Seven was about the importance of “leadership.” Leadership was one of the very things Hammer and Champy had minimized as being important in their re-engineering philosophy. During the heady days of Champy’s and Hammer’s rise to fame, business leaders were distracted from implementing true leadership approaches by quick-fix fads such as re-engineering. Nevertheless, “Re-engineering remained (more or less) the order of the day. For a complete disavowal [of reengineering] America had to wait until 2001, when Hammer would himself publish in *The Harvard Business Review*.” In *The HBR* article Hammer (just as Champy had done earlier) advocated many things which were the *very opposite* of what had been considered previously to be a breakthrough and revolutionary re-engineering methodology^{xx} and he embraced a new approach –that in fact seemed very much like Deming’s well-proven approach. COMMENT: By 2001 when Hammer recanted re-engineering, the damage unproven fads such as re-engineering did to Deming’s approach had been done. Deming was dead and more fads continued to distract too many leaders from the real and proven leadership work to be done. In essence, the Hopper brothers conclude that Deming’s great management philosophy did not achieve the widespread nor complete implementation it deserved, and that as a nation we are poorer as a result.

THE HISTORY OF MANAGEMENT THOUGHT, Fifth Edition. By Daniel A. Wren. 2005. John Wiley & Sons, Inc.

- This 500+ page tome covers 4000 years of management thought. Deming is included in two pages in a section fittingly entitled “Old Lessons Relearned” in which Wren writes about the historical and continuing importance of quality and management: “in the early craft guilds, for example, it was the practice to place a mark on the product (hallmark) so that customers could connect quality with the maker of the item.” Wren continues with the importance of being able to manage an enterprise so that

quality would result through efficient and effective means. “The challenge [after World War II] was whether the United States could relearn the lessons about quality, efficiency, and productivity that it had been teaching the rest of the world...” When Deming was featured in 1980 in “If Japan Can... Why Can’t We?” American audiences finally became aware of him and what he had to say about management practices leading to quality outcomes. Interestingly Wren chose not to include Deming’s famous 14 Points for Management; instead he included the “seven deadly diseases that caused U.S. industry to go into decline.” COMMENT: The Seven Deadly Diseases have still not been rooted out of most organizations and one wonders if America is still in decline, at least in part, as a result. As evidence I offer that the Seven Deadly Diseases can still be seen: 1. a lack of constancy of purpose by leaders, 2. emphasis on short-term profits, 3. merit ratings of individual performance, 4. job hopping by leaders, 5. managing by the visible numbers without considering figures that are unknown, 6. excessive medical costs, 7. excessive costs of liability and litigation by lawyers on a contingency basis.

THE AGE OF HERETICS: A History of the Radical Thinkers Who Reinvented Corporate Management. By Art Kleiner. 2008. Jossey-Bass.

- Art Kleiner may be best known as editor-in-chief of *strategy+business*. He also has authored and co-authored several acclaimed business books and articles, some of which have included sections on Deming. In THE AGE OF HERETICS he devotes several pages to Deming, his contributions, and his passionate commitment to help America, even though many senior executives exasperated him with their unwillingness to let go of unproven and even harmful management beliefs. “In many settings, and especially in Japan, Deming was revered for his courtesy and humility. But he was also known for bullying Americans, especially if they were senior corporate leaders.” On the other hand he understood the worker’s plight. “How can a production worker take pride in his work when after stopping his machine to adjust it because it was only making defective product, the foreman comes along and orders him in two words ‘Run it?’” Even though Deming was frustrated with senior executives who had the power to change things but were slow to do so, during the 1980s when he was in his 80s “Deming pushed himself relentlessly,” to reach as many people as possible, “teaching at Columbia and New York universities ... giving a seminar somewhere around the world . . . and he consulted. Ford and GM were regular clients in the 1980s [despite his dramatic run-ins with senior leaders in both companies.]” “More countercultural than Deming’s manner [with executives] were his ideas, which contradicted some of the most enshrined practices of American management, especially the management of people.” When asked about the rating and ranking of people by their bosses, and “how else do you get bright people to achieve? Deming’s answer essentially was that bosses must be deeply involved in helping every one of their employees improve—a level of human intimacy that... people went into corporations specially to escape.” “Perhaps his most controversial point was the simplest: the idea that workplaces should be free of fear and anxiety.” “But western managers felt, from their bone marrow to the roots of the hair, that without fear, there could be no progress.” “Drive out fear? You might as well paint a ‘take me over’ sign on the headquarters front door.” “[Deming’s style in seminars] was downright oracular . . . and Deming could marshal statistics for support.” “[Attendees] might be bored as he droned on, but they were enraptured all the same. And for awhile, it seemed as if everyone, from bosses on down, was listening.” “Deming in particular found himself called on by dozens of major companies....” “But after his death in 1993 [at age 93] the prevailing corporate culture seemed suddenly to shift: to lose interest in operational quality, excellence, and developing people. . . By 1996 ... essentially the numbers culture [that Deming tried to reform] had reasserted itself.” COMMENT: The management by visible numbers alone was included as one of Deming’s 7 Deadly Diseases. The disease is far from being eradicated and continues to harm American organizations, by causing leaders and managers to make damaging, but seemingly logical decisions.

SYSTEMS THINKING IN THE PUBLIC SECTOR: The Failure of the reform regime...and a manifesto for a better way. By John Seddon. 2008. Triachy Press.

- Professor John Seddon is credited with translating the Toyota Production System for use in service organizations. In his recent book he tackles waste in government and highly recommends a solid understanding of the teachings of W. Edwards Deming. “[Deming] pointed out that the present style of management is something that needs reinventing: the systems approach represents a fundamentally

different and more effective way to design and manage work.” “Deming argued that organizations should be managed as systems, not as functional hierarchies.... He gave powerful illustrations and introduced managers to ... important tools for their decision making.” “Moreover systems thinking is concerned with increasing capacity. It is as Deming taught: better quality leads to lower prices, greater market share, growth and, thus, to more jobs. Those who seek cost reductions will fail, yet, paradoxically, cost reductions are a by-product of systems design.” Seddon quotes Deming extensively in his book, including a call to action to change the status-quo of management thinking before things get even worse: “Most people imagine that the present style of management has always existed, and is a fixture. Actually, it is a modern invention –a prison created by the way in which people interact.” COMMENT: Deming provided four key elements which help organizations break out of the prison. He encouraged leaders to gain: understanding of value of knowing about variation, and especially statistical variation; understanding of psychology, and those mistaken beliefs which, nevertheless, hold us hostage; understanding of systems and systems thinking –and how to lead systems; and understanding of the rigorous scientific approach of testing our beliefs against actual practice before we implement our beliefs or trust data.

JUMP START YOUR MARKETING BRAIN: Scientific Advice & Practical Ideas. By Doug Hall. 2005. Clerisy Press.

- Hall has written several books, maintains several websites, and quotes Deming extensively throughout them. At least three of his books are best sellers.^{xxi} Hall has “sought to apply Deming’s Scientific Method to sales, marketing, and innovation.” As demonstrated by the testimonials he has received from clients, Hall’s application of Deming has succeeded on behalf of his clients and helped them to have more success and to make more money. Hall encourages his readers and students to study Deming^{xxii} to learn “what needs to be done to create a winning organization in the future.” This is not mere soapbox urging. Hall provides example after example of how to win. Hall also writes about how he came to appreciate the teachings of Dr. Deming and how he was affected by hearing about his father’s firsthand experience with Deming at Nashua Corporation (where his father was director of Central Engineering). “I’ll never forget my father’s excitement as he spoke of Dr. Deming’s principles and processes. He spoke in wonder at the near-miraculous results he witnessed. Eventually NBC did a story on what was happening at Nashua Corporation, leading to a team from the Ford Motor Company and others travelling to the company’s headquarters in Nashua, New Hampshire.” Continual learning is one of the foundations of Hall’s success and is integral to what he teaches others. He quotes Deming and reminds us that “Learning is not compulsory . . . neither is survival.” COMMENT: The application of Dr. Deming’s management approach to marketing and innovation lagged the acceptance of his approaches to “quality” improvement. However, in recent years the American Marketing Association has been publishing articles on topics related to applying Deming’s methods to marketing.^{xxiii}

PROFIT BEYOND MEASURE: Extraordinary Results through Attention to Work and People. By H. Thomas Johnson and Anders Bröms. 2008 paperback of 2000 hardback. The Free Press.

- Johnson is famous for several reasons:
 - He (along with Robert Kaplan) popularized the concepts that would become known as Activity-Based Costing (ABC) –ABC in the late 1980s swept through corporations and business schools like a tsunami.
 - A few years later and with much publicity, Johnson recanted the value of ABC.
 - In the 1990s Johnson had almost unprecedented access to Toyota and as a result has provided well-documented insight into how the company operates without the pitfalls of ABC.
 - He is included in THE HISTORY OF MANAGEMENT THOUGHT by Daniel Wren.
 - He continues to publish widely on business, systems, and sustainability of organizations.

Johnson also enjoys the respect of many thought leaders, including Peter Senge, who writes in the introduction to PROFIT BY MEASURE: “Johnson and Bröms’s ‘management by means’ may be the third element . . . that could form the basis for a second industrial revolution that would close the circle and enable humans to live once again as a part of, rather than apart from, nature.” That is a powerful endorsement and is pertinent for many reasons, not the least of which is that Johnson and Bröms quote Deming extensively in their book and credit him with many world-changing insights. One such insight is

centered on Deming's urging of leaders to develop a "living process map" of their system and subsystems. The authors find evidence of the value of Deming's advice (to create a living process map) in an example of one aspect of how a Toyota plant operates. "The continuous flow of Kanban in a Toyota plant implicitly generates such a map every minute of every operating shift."^{xxiv} The authors discuss many of Deming's points at length and one which especially resonates with them is related to Deming's admonition that management should neither attempt to manipulate people nor tamper with systems. They write, "the best results come to those who value and nurture proper relationships and who refrain from trying to force results by arbitrarily manipulating the system." Their research and their philosophy supporting a systems view are compelling. Equally compelling is their discussion of Deming's encouragement of businesses to adopt a new philosophy of management because doing so will make all the difference. They provide worthwhile, deeply researched, and detailed examples of aspects of the new philosophy in their book. COMMENT: The link to—and understanding of—Toyota by both Deming and Johnson is just one element of many which makes PROFIT BEYOND MEASURE an especially valuable book^{xxv}.

2 More Books:

Our research turned up a number of books which cite Deming in lesser and more matter-of-fact ways than the 12 books, above. Nevertheless, they include a great deal of content on leadership, philosophy, and/or methods which remind one of Dr. Deming's philosophies. We discuss two such books, below.

In all cases the books that include Deming in a matter-of-fact way either cite Deming or key people who worked closely with Deming, such as Peter R. Scholtes^{xxvi} but they do not discuss Deming at length. It is possible, of course, that the authors may or may not know that Deming was the pioneer who developed (or advocated and brought to the forefront of thinking) many of the very ideas they include in their books.

It appears that the authors of the following books may not have studied Deming's teachings as thoroughly as those authors of the twelve books, above. That is not a criticism, merely an observation. These authors, after all, have their own suggestions to make, which is the point of writing a book.

Without interviewing the authors of the books that follow, it is difficult to know how their approach came to parallel Deming's philosophies. Were they exposed to Deming's ideas directly through Deming's books or attending seminars? Did they come into contact with his teachings and ideas by reading other authors who were close to Deming and whose thinking was shaped by his? Are many of Deming's philosophies now so interwoven into business that these authors naturally synthesized them into their own original contributions? Interesting questions (at least to me), and I plan to address them in future research.

THE SOFTWARE PROJECT MANAGER'S BRIDGE TO AGILITY. By Michele Sliger and Stacia Broderick. 2008. Pearson Education, Inc.

- The Agile Process of software development^{xxvii} has been growing in popularity for several years. The originators and innovators of the Agile Process give credit to the Toyota Production System (developed by Taiichi Ohno^{xxviii} --and influenced by W. Edwards Deming) for spurring their thinking and innovation. In fact, in Sliger's and Broderick's book Dr. Deming is mentioned in connection with foundational management methods for rapid iterative improvements that are applied to software development; and in regard to enlightened human resource management. For example, the authors quote Deming, "(The annual employee performance review) nourishes short-term performance, annihilates long-term planning, builds fear, demolishes teamwork, nourishes rivalry and politics.... It leaves people bitter, crushed, bruised, battered, desolate, despondent, dejected, feeling inferior, some even depressed, unfit for work for weeks after receipt of rating, unable to comprehend why they are inferior. It is unfair, as it ascribes to people in a group differences that may be caused totally by the system that they work in." Sliger and Broderick provide guidance to readers which is in alignment with Deming's teachings including everything from abolishing performance appraisals (and replacing them with coaching and real-time feedback to help with the team member's success) --to bringing out intrinsic motivation via work environment (versus providing extrinsic motivators such as individual recognition, rewards and punishment). COMMENT: It is very interesting to see the relevance of Deming's approach in leading-edge and innovative industries such as software development. The

universal application of Dr. Deming's leadership and management teachings is not to be underestimated.

YOUNG GUNS: The Fearless Entrepreneur's Guide to Chasing Your Dreams and Breaking Out on Your Own. By Robert Tuchman. 2009. The American Management Institute.

- Tuchman is a successful entrepreneur and one of his companies has been listed on *INC Magazine*'s list of America's Fastest Growing Privately Owned Companies. Tuchman's book provides practical advice to inexperienced (and often impatient) entrepreneurs. Tuchman uses Ben and Jerry's Ice Cream as a "particularly powerful" example of an entrepreneurial company that did a lot of things right from the very start, including having a focus leadership focus which treats quality as a result of effective leadership. Tuchman points out how Deming's system of quality and management can "improve quality in a measurable way" and that it can build teamwork, individual responsibility, and efficiency. He also writes about strong relationships with employees and customers that come from a quality focus, a focus which includes among other things both treating people properly and the importance of constancy of purpose. COMMENT: Those concepts were, of course, at the core of Deming's New Philosophy of leadership in which management practices permeate the organization and create quality in products and services.

Articles:

We found 172 articles^{xxix} which quote, cite and/or recommend Dr. Deming's contributions. We had originally intended to categorize and summarize several articles in the same fashion as we did with the 12 books (above). Because we were surprised by the number of books citing Dr. Deming, we had more books to investigate and simply ran out of time to do an in-depth qualitative analysis of the articles and still meet the deadline for delivering this paper.

We did make time for one type of qualitative analysis on articles, however. *In our research we uncovered a great number of articles in magazines and newspapers which offer advice that is very much in accord with Deming's philosophies, yet the authors don't cite Deming per se.* This is not an unusual practice in business magazines articles and newspaper columns. Columnists have a word limit and thus don't have the luxury to use limited, valuable space in a column for the giving of credit for every idea they share in their attempts to provide suggestions and clarity to their readers.

I also have a growing sense (gained from talking with people and reading widely) that at least two other hypotheses exist to explain why non-attribution has happened in regard to Deming's body of work:

1. Such a great many of Deming's ideas have become integrated into the fabric of good management practice that people no longer are aware of where the idea actually originated. The abolishment of performance appraisals is one such example. Many magazine and newspaper columnists who support the abolishment of performance appraisals in their columns may not know it was Deming who included the annual performance review in his list Seven Deadly Diseases decades ago.
2. In the years since Deming's death the generations of students studying leadership and management may be learning their lessons from sources (books, magazines, articles, faculty) that likewise do not know that Deming was the person who created the body of work which now guides many proven aspects of leadership.

Examples of analyses and/or commentary that make no reference to Deming, but which are very much in accord with Deming's philosophies:

- *The Financial Times*. "The value added by the world's best CEOs" from the regular column entitled "Business Life: On Management" by Stefan Stern, FT's management columnist. Dec. 15, 2009, pg. 14.
- Stefan Stern covers many topics in his column and he has won awards from the Work Foundation and the Management Consultancies Association for his insights and contributions. In the December 15, 2009 column he questions the conventional wisdom about the value of CEOs.
- "Let me restate my belief that, sometimes, too much attention gets paid to individual CEOs, and not enough to the work that goes on elsewhere inside the businesses." As an example, he uses A.G. Lafley, the universally acclaimed and retiring CEO of Procter and Gamble. "A.G. did not invent P&G's

blockbuster cleaning product Swiffer, for example or lead on every aspect of the company's merger with Gillette." Stern's point is, of course, that Lafley had a big impact on P&G because he helped create the environment in which others could be successful. This would be in accord with aspects of Deming's philosophies.

Deming wrote that "the aim of leadership should be to improve performance of man and machine, to improve quality, to increase output, and simultaneously to bring pride of workmanship to people. . . .The leader also has responsibility to improve the system—i.e., to make it possible, on a continuing basis, for everybody to do a better job with greater satisfaction."

It seems Lafley may have led with the intent of helping others increase their performance and the performance of the system. Moreover, he was a stickler for quality; he fostered the growing output of the P&G system; and he supported the evolution of the P&G system to encourage pride in work.

- *The Wall Street Journal*. "No More Executive Bonuses! The problem isn't that they are poorly designed. The problem is that they exist." By Henry Mintzberg (guest column). Nov. 30, 2009, pg. R3.
- Henry Mintzberg is a distinguished professor and author. He is an original thinker in his own right. In his books he writes eloquently about the problems with—and limitations of—business school curricula and about the dangers of implementing mistaken beliefs about the ingredients that result in successful leadership and management. Many of his comments in this article are similar those made by Deming through the decades. Here are a few examples:
 - "How do you assess the long-term performance of a CEO? Some proposals look at three years, others as many as 10 years. But can we even be sure of 10 years? Is a decade long enough in the life of a large company with all its natural momentum? How many years did it take to bring General Motors to its knees?" Deming said that in many cases 10 years was the minimum time needed to assess a person's contribution^{xxx}.

Mintzberg: "Put differently, executive compensation these days reinforces a class structure within the enterprise that is antithetical to its effective functioning.... executive compensation as currently practiced sends out the worst possible signal to everyone in the enterprise." It encourages everyone, not just executives, to cash in by cutting maintenance, customer service, and other goodwill which results in trashing valued brands.

Again, Deming's and Mintzberg's philosophies are in harmony. Deming wrote that when leaders don't look long term and when they don't view the organization as a system they unleash the forces of destruction. Incentive pay, achieving numerical goals without a method, and competition between people, groups, and divisions are a few of the forces of destruction he identified.^{xxxi} All are points Mintzberg makes in his guest column.

QUANTITATIVE RESEARCH FINDINGS and METHODOLOGY

We conducted a thorough but by no means exhaustive study of books, magazine articles, and newspaper citations. Please see the complete list of books and articles we found at: <http://www.kellyallan.com/fordham2010/>.

Books: Of the more than 258 books our research identified as citing Dr. Deming and being published between January 2005 and December 2009, we classified 102 as being connected with "leadership" and "management." These 102 books include topics related to general business advice, as well as finance, sales, marketing, education, and healthcare management. Books on quality (which included "quality and health care" and "quality and education") and quality management which cited Dr. Deming numbered 122. There were 34 books on the topics of "Operations," "Engineering," "Project Management," "Science", and other categories which cited Dr. Deming.

Articles: Please see <http://www.kellyallan.com/fordham2010/> for information on the numerous databases we used to find 172 articles citing Dr. Deming. Again, we are confident there are many more than 172 article citations. We checked 24 databases covering more than 3600 periodicals, which we believe is a worthy number. It does not begin to cover the sum total of databases available, however.

Internet searches & RSS alerts: Internet searches for “Deming” produced hundreds of results. When one adds another name to the search, even more results are found: “Deming and Drucker,” “Peter Drucker and Deming,” “Deming and Jim Collins,” “Collins and Deming,” “Malcolm Gladwell and Deming,” “Henry Mintzberg and Deming,” “Tom Peters and Deming,” “Ram Charan and Deming,” et cetera. In addition we calculate there were more than 1000 Google News, Web and Blog alerts in 2009, alone.^{xxxiii}

CONCLUSIONS

The body of work of W. Edwards Deming continues to influence the way business authors, thought leaders, and journalists write about the best way to lead and manage organizations. Further: many of the most well-known and distinguished business practitioners, business thinkers, academics, and historians cite Dr. Deming as a man of great insight, even genius, and they advise us to return to studying what Deming taught.

In fact, if you add up the many citations in books, magazine articles, and newspapers, there is the equivalent of a mention in a book or article almost twice every week for the past 5 years. If you add in publications and citations that are published only on internet sites and/or only via blogs the equivalent easily exceeds the equivalent of 1 citation per day, 365 days per year. Indeed, the fact that Dr. Deming is so well represented on the internet/web and in the blogosphere indicates both that many more people than we realized are aware of him and that his ideas live on.

Deming is one of a few people whose philosophies continue to be relevant to business leadership and management practices long after their death. Examples of Deming’s relevance include:

- The breadth of his influence across industries is astonishing. He is cited for his contributions in everything from manufacturing and service businesses to government and non-profits –and in organizations large and small.
- The breadth of application of his body of work to different disciplines is equally amazing; everything from finance and engineering to software development and entrepreneurship.
- The citations we found include a large number which relate to Deming’s proven foundation for leadership and management approaches –not just to “quality.”

It seems certain that Deming’s relevance will continue for decades to come. The evidence for this takes several forms:

- The documentation found during our research shows that during the past 5 years hundreds of writers were citing, quoting, and using Deming’s approach in their own books and articles.
- From my research and experience, I speculate that most leaders have selected to implement only the “quality improvement” areas of Deming’s body of work. Given that many authors are encouraging a return to studying Deming’s “leadership” philosophies, it is more likely that these lesser known leadership aspects of Deming’s body of work could ignite even greater use of Deming’s advice by more and more organizations. As I wrote above, Deming looked at the management/leadership philosophy and practices as the driving force to create quality in products and services. He did not speak about “quality” as being separate from leadership—although many business leaders made such a distinction, much to Deming’s chagrin. Thus, a call for a return to Deming’s leadership philosophies is a call for a return to Deming’s entire body of work.
- With the world coming to the financial brink in 2008/2009 many thought leaders have begun to question if some of the popular beliefs about leadership and management should be rethought. Our research indicates that some of them are calling for a return to Deming’s teachings.
- Many business practitioners and writers have adopted –and advise—the use of management approaches that are consistent with Deming’s approaches, whether or not they know the approaches originated with Deming. As these approaches are read and spread, Deming’s contributions (even if not his name) will live on.

In a future research paper I intend to explore the reasons why Deming’s New Philosophy of leadership has not yet set off a revolution in the way organizations are led (versus the revolution of “quality” –which is so

often made the responsibility of the “quality department”). One reason for this was summed up eloquently by Lawrence U. Costiglio^{xxxiii} in November 2009 (in a conversation). Mr. Costiglio said, “Implementing some of Dr. Deming’s most powerful teachings is not like running a simple chemical experiment. In a simple chemical experiment you get to enjoy seeing the results right away. With much of what Deming advocated, the results don’t manifest themselves quickly. That’s tough for many leaders to accept and to implement in the world we live in – a world of push-button expectations for instant results.”

Yet, as one author wrote about Deming, Drucker, and others, “We ignore the truth of their message at our own peril.”^{xxxiv} At what point do conditions become so dire that it is no longer a relevant excuse to put off implementing the New Philosophy because we live in a push-button world in which executives live by quarterly earnings reports? At that point is it already too late?

¹ “Viral” is used in this context to mean “viral communication.” In other words, Dr. Deming’s teachings have spread (have been communicated) from one person to another by the nature of their value and ability to endure and be effective/useful, rather than via a centralized effort to publicize them. This spread of Deming’s influence is evidenced in books, articles, and the internet.

¹ We say “more than 258 books and 172 articles” because we are certain there are more, which we did not uncover in our searches. Please see the complete list of books and articles we found at: <http://www.kellyallan.com/fordham2010/> . We have included only citations in English and we have NOT included the hundreds internet-only listings we found via search engines. Dr. Joyce Orsini’s research shows that in looking over many decades one can find several hundred operations textbooks which cite Deming. In addition Orsini’s research shows that Deming’s book, *OUT OF THE CRISIS*, has been cited more than 11,000 times since its publication.

¹ By “Internet/blog-only citations” we mean those references to Dr. Deming which do not appear in books or articles, but which appear in blogs and websites.

¹ More than a dozen books have been published in the past 5 years about Toyota’s system of leadership, management, innovation, and success.

¹ *THE SOFTWARE PROJECT MANAGER’S BRIDGE TO AGILITY*. By Michele Sliger and Stacia Broderick. 2008. Pearson Education, Inc.

¹ *YOUNG GUNS: The Fearless Entrepreneur’s Guide to Chasing Your Dreams and Breaking Out on Your Own*. By Robert Tuchman. 2009. The American Management Institute.

¹ Please note that I am not endorsing any book nor passing judgment on any author’s interpretation of Dr. Deming’s body of work.

¹ Please see the complete list of books and articles we found at: <http://www.kellyallan.com/fordham2010/>. We have included only citations in English and we have NOT included the hundreds internet-only listings we found via search engines.

¹ The Shingo Prize for Operational Excellence is named for Japanese industrial engineer Shigeo Shingo who distinguished himself as one of the world’s leading experts in improving manufacturing processes. Dr. Shingo has been described as an “engineering genius” who helped create and write about many aspects of the revolutionary manufacturing practices which comprise the renowned Toyota Production System. The Shingo Prize was established in 1988 to promote awareness of Lean concepts and to educate, assess and recognize companies that achieve world-class operational excellence status around the globe. The Shingo Prize philosophy is that world-class business performance is achieved through a deep understanding and integration of Lean principles, Lean systems of management, and the wise application of Lean tools and techniques to create a sustainable culture of continuous improvement.

¹ The McKinsey Awards were established in 1959 by Ed Bursk, then the editor of *The Harvard Business Review*, with support from McKinsey & Company. The idea was simple: to recognize practical and

groundbreaking management thinking by asking a panel of both business leaders and scholars to determine the two best articles each year in *The HBR*.

¹ Deming's "New Philosophy" of leadership was often referred to by others as the "continuous improvement" leadership frame of mind. In fact, the New Philosophy is a sophisticated, holistic and integrated body of thought which provides the foundation for transforming organizations into optimized, productive, efficient, effective places where employees can find—and create—joy in work. The New Philosophy defines relationships with customers and suppliers, as well.

¹ Deming has 7 citations in THE 100 BEST BUSINESS BOOKS OF ALL TIME, as does Marcus Buckingham, Jim Collins, Malcolm Gladwell, Tom Peters, and Ram Charan. Peter Drucker has 5 citations as an author and has an additional 12 citations for his books. Deming has a total of 11 citations when you add in the citations for his books.

¹ From THE AGE HERETICS by Art Kleiner, footnote 41, chapter 9: "Toyota Vision and Philosophy" retrieved January 2008 from http://www.toyota.co.jp/en/vision/tradition/sep_oct05.html

¹ From THE TOYOTA WAY, pages 82 and 83. I include this quote even though it is from the 2004 book because it is echoed in the later two books which fall into the 2005 – 2009 time frame of our research.

¹ From the *Financial Post*, October 2, 2009.

¹ From *Business Week*, June 25, 2009.

¹ TQM was often used by authors and reporters to mean Deming's management philosophy. Deming, himself, tried to avoid such labels because they were often associated with management fads rather than with true transformation to the New Philosophy of management which he taught.

¹The Hopper brothers quote Andrea Gabor's, THE CAPITALIST PHILOSOPHERS.

¹ Point 7 of Deming's Fourteen Points for Management is "Institute Leadership: The aim of supervision should be to help people and machines and gadgets do a better job. Supervision of management is in need of overall as well as supervision of production workers."

¹ I remind readers of Pfeffer's and Sutton's advance in HARD FACTS against embracing "breakthrough and revolutionary" ideas because they usually fail.

¹ The 3 books are: JUMP START YOUR BUSINESS BRAIN: The Scientific Way to Make More Money. JUMP START YOUR BRAIN 2.0: How Everyone at Every Age Can Be Smarter and More Creative. JUMP START YOUR MARKETING BRAIN.

¹ Hall also encourages people to read RE-IMAGINE by Tom Peters; THE RISE OF THE CREATIVE CLASS by Richard Florida; and AS THE FUTURE CATCHES YOU by Juan Enriquez.

¹ Often these are referred to as applying "Six Sigma" tools to marketing. Six Sigma is not to be confused with Deming's more cohesive and holistic approach. The Six Sigma methodology did adopt elements from Deming's philosophy, but perhaps not enough of them. It also became somewhat faddish.

¹ Kanban means "visible record, signboard, card, or ticket" in Japanese depending on who is doing the translating. Essentially it is a system of notification from one process to the other in a manufacturing system. Kanban cards are stored in a bin or container that holds the inventory. They describe the parts, supplier and quantity. When the bin is emptied, the Kanban is used to order more for Just-In-Time and Lean processes.

¹ In an article "The Unnatural Environment" published in 2009 by CQI, the Chartered Quality Institute, Johnson writes, "Toyota has reported annual losses in the last two years of global recession, after nearly 50

years of achieving unmatched financial results in its industry. Shoichiro Toyoda, the 84-year-old family patriarch and honorary chairman of Toyota Motors, responded to this by announcing a stunning shake-up of top management. He chastened top managers for losing sight of the fundamentals that had made the company so outstanding and promised that the company would return to the basics. The company's financial reversal occurred, he indicated, not primarily because of the recession's severity, but because after 2000 the company's top executives made the mistake of pursuing finance-driven growth and pricing at the cost of sacrificing the basic principles that had made Toyota thrive.... But Toyota's financial slump is not a call to tighten lean practices. Rather, it is the result of rapid and excessive global expansion...prompted by top management placing a new and unprecedented focus on reaching bottom-line financial targets. Is there a lesson here, not only for Toyota but for businesses worldwide?"

¹ Peter Scholtes worked with Dr. Deming for many years. Scholtes wrote two best-selling books: THE LEADER'S HANDBOOK: Making things Happen, Getting Things Done; A Guide to Inspiring Your People and Managing the Daily Workflow. 1998. McGraw-Hill. THE TEAM HANDBOOK. 3rd Edition 2003. Oriol: A SAM Group Company.

¹ I have been a speaker for—and a consultant to—the Agile Software Consortium and have become familiar with its philosophy, manifesto, and structure.

¹ Taiichi Ohno is considered to be the father of the Toyota Production System, which of course, has strong elements of Deming's teachings embedded in it.

¹ Again, we are confident there are many more than 172 article citations. We checked 24 databases covering more than 3600 periodicals, which we believe is a worthy number. It doesn't begin to cover the sum total of databases available, however.

¹ Source: the compact disks of Deming's Four-Day Seminars

¹W. Edwards Deming: THE NEW ECONOMICS, second edition. Page 122. 1994. MIT Center for Advanced Educational Services.

¹ Source: Kevin E. Cahill who received more than 500 Google News, Web and Blog alerts during the 6 months of July – December 2009.

¹ Mr. Costiglio is an attorney with a long and distinguished career. Now "retired" he works with the W. Edwards Deming Institute and Fordham in a variety of ways, including as co-chair (with Joyce N. Orsini) of the Sixteenth Annual International Deming Research Seminar.

¹ CHASING THE RABBIT. Spear, Steven J. New York: McGraw-Hill 2009, pg. 363.

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Please see the complete list of books and articles we found at: <http://www.kellyallan.com/fordham2010/>. We have included only citations in English and we have NOT included the hundreds internet-only listings we found via search engines. Additional references include:

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USING DEMING METHODS TO TRANSFORM HEALTH PROMOTION

Craig M. Becker, PhD.
Department of Health Education & Promotion
beckerc@ecu.edu

Abstract

The quality movement initiated by W. Edwards Deming, first in Japan and then throughout the world, focused on process improvement. These strategies have been successfully applied to industry, government and education. Health promotion efforts, beyond illness care, have not used the Deming method. Integral to Deming's process improvement methods was optimization and a system perspective. Deming's system perspective promoted a new style of management that optimized each subsystem to enhance the whole system which resulted in quality improvement and decreased costs. This transformation should also focus on optimizing health because of how health status influences productivity. Deming's 14 points provide a guide for how health professionals can implement practices to optimize the worker's health and thus contribute to the organizations health. This paper provides an outline of how to institute a Positive Health Leadership program using Deming's 14 points.

THE JOURNEY TO THE UN-GOVERNMENT EXPERIENCE Sustaining a Culture of Quality

Georgette Bonifacio Carroll
Goddess of Excellence and Opportunity,
Tax Collector's Office, serving Palm Beach County
gcarroll@pbcgov.org

Perspective

In Florida, the Tax Collector's Office (TCO) functions as the independent body designated by the Florida constitution to collect property taxes and fees, account for them, and distribute them to the taxing authorities and state offices that levy those fees and taxes. As a back office function and the only game in town, a focus on quality and constancy of purpose may seem out of sync as we are an invisible governmental function. Our Office is funded by a percentage of collections and mandated state fees, and in Palm Beach County, the fees continually exceed the annual operating expenditures, virtually eliminating any compelling reason to look closely at operating efficiently. Each year, approximately 65% of our fees were returned to the taxing entities as excess revenue. As the economy began to slow down, taxing entities expressed a concern for more excess revenue and the demand for services to be provided locally began to grow. Meeting the new demands created the opening to implement change.

The constitutionally elected office of the Tax Collector representing Palm Beach County was entrenched in an aged paradigm. Customers were generally viewed as captive audiences, processes were handed down during water cooler conversations, and workers were often inhibited from working together to break down departmental barriers. Competition existed between the different locations as each area sought to enhance their own stature and to protect their place in the organization.

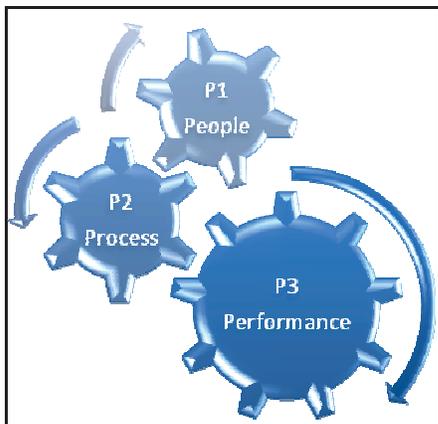


Figure 1- TCO Quality Machine

Transformation was met with resistance as well as hopefulness. We were the classic description of managers and workers from Deming's Red Bead Experiment. Our challenge was to shift the culture and capability of staff from adherence with instructions to one of *Intention* – always owning the quality of processes and service delivery. The new Senior Leadership Team (SLT) heard the words – It's about process, then about people, with a focus on performance. Our core team was acutely aware of the steep learning curve involved, the test of our constancy of purpose and the importance of critical mass in every step of the process. All three cogs of our quality machine were synergistic - all parts had to function effectively and efficiently and none of the parts alone function as well as the whole. Quality is a people business and instituting quality processes towards sustainability meant all areas had to be addressed with patience, purpose and passion.

P¹ The People - Sustainment through Engagement

Alignment of the leadership team to the vision of quality became the cornerstone for Constancy of Purpose. Building consensus around quality takes more than establishing a vision and hoping all the staff members will actively engage in sustainability of work. The approach of the Tax Collector's Office is to purposefully cascade down skills and build inclusivity along the way. Building a leadership team to inspire employee engagement and ownership meant leaders had to become owners first. While we under-estimated the effort required, we also under-estimated the willingness of many of the existing staff to commit to the process. Our *Action Learning* approach allowed us to balance the need to energize staff with the need to build capability over time. This meant cascading down all key efforts using this four step method:

- *Facilitate* through coaching using a process management model framework,

- *Demonstrate* through leading by example and walking the process from end to end,
- *Practice* where core team members take the lead to develop the implementation plans with assistance from coach/facilitators, and,
- *Evaluate* through a continuous improvement cycle that ensures the process meets all requirements including alignment between target capabilities, accountability, communication, and performance measurement.

During the summer of 2007, our managers and leaders met to develop direction as the forerunner of the first Strategic Planning Cycle. The approach was to start small, with key steps designed to promote inclusion, build consensus, encourage discussion and create a safe practice field using creativity and visual concepts.

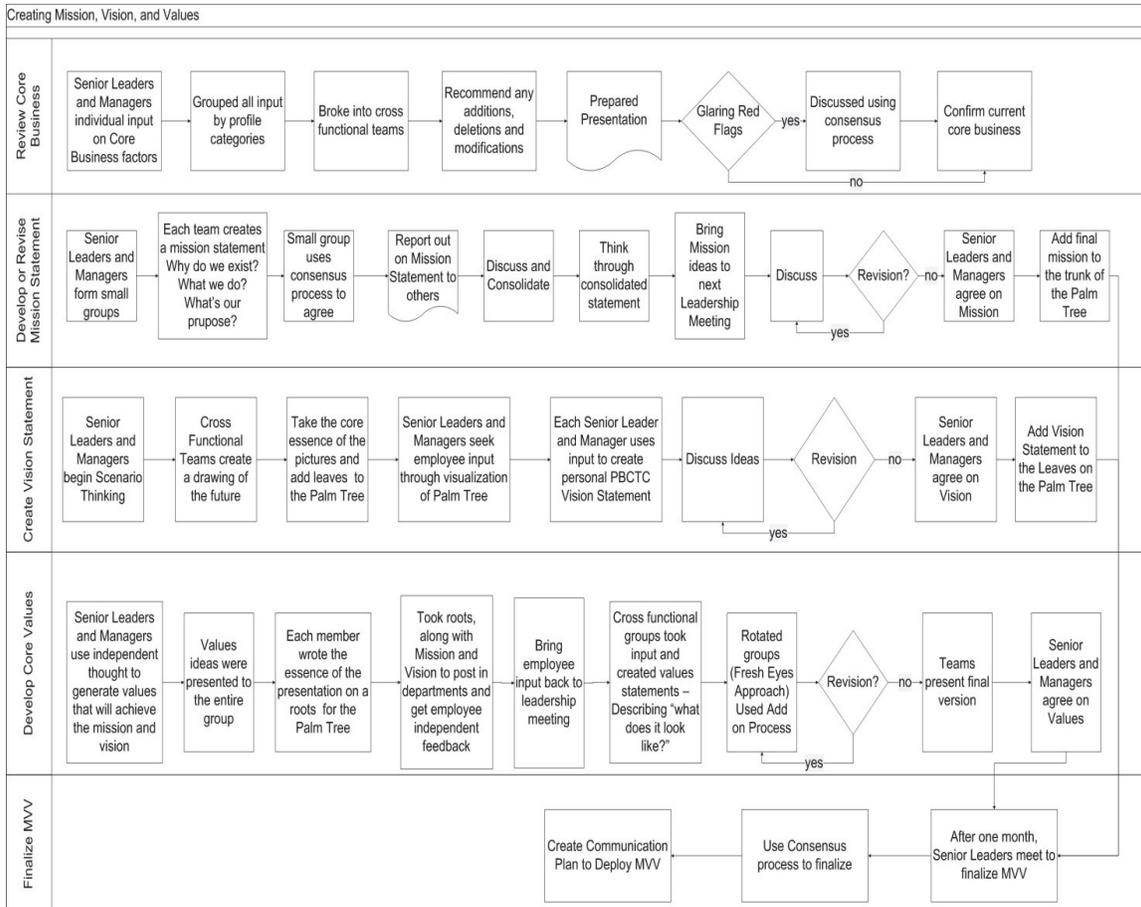
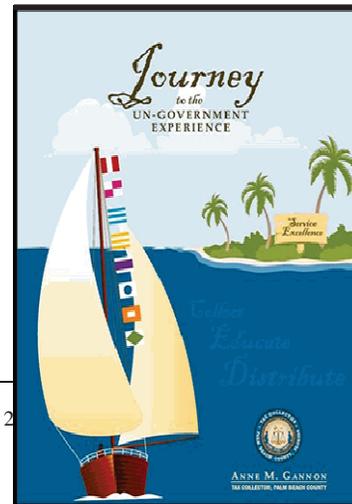


Figure 2 - Process of Inclusion

A Palm Tree became the visual metaphor of the new direction: The trunk as the mission, supporting the organization with the rings representing the years of growth; the leaves representing the vision, reaching upward to the sky, and the roots as the values that drive behavior and provide the depth and strength of the tree – grounded in principles that lead to excellence. This method created the Leadership practice field while allowing strategic development of process steps as understanding of leadership tenets grew.

The outcomes of the first direction-setting exercise created a system-wide mission, vision, and values statement, defined with input from all and refined to reflect our focus on improvement and client satisfaction



with our services. In keeping with the visual approach, the metaphor of the Palm Tree transformed the TCO from a place where business was “good enough for government work” to one that was *UN-government* and a *Memorable Experience*. Reaching the UN-government Island thus became a journey, aboard a sailboat, to our destiny defined as world class. This was not a meaningless slogan, but one with descriptors of *Intention* and behavior designed to create our vision “*As a world class organization, we enthusiastically work together to create and deliver the highest standards of service excellence*”, and live our values as we carry out our mission to Collect, Educate and Distribute. The value of Fun was added after the first year, when we developed our strategy to create an environment of personal ownership of our client issues, and adopted the “MAKE THEIR DAY” philosophy of the Pike Place Fish Market.

<p>Mission: The Palm Beach County Tax Collector’s Office collects and distributes taxes, fees and revenues for the benefit of our community.</p>	Values	
<p>Vision: As a world class organization we enthusiastically work together to create and deliver the highest standards of service excellence.</p>	 <p>Teamwork – We respect each person’s role and recognize the value of trust and cooperation in achieving a common goal.</p>	 <p>Communication – We listen actively; take all issues directly to the source and share accurate information.</p>
	 <p>Learning – We foster an environment of continuous improvement and personal growth by pursuing opportunities to increase knowledge.</p>	 <p>Diversity – We value our differences and similarities by recognizing, respecting, and appreciating each person’s contribution.</p>
	 <p>Integrity – We perform our jobs with the highest standards of ethical behavior.</p>	 <p>Creativity – We encourage continuous improvement through the sharing of innovative thoughts and ideas</p>
	 <p>Professionalism – We are responsible, respectful, and engage in thoughtful, fact-based decision making.</p>	 <p>Fiscal Responsibility – We embrace operational effectiveness</p>
	 <p>Fun – Yes, that’s right! We value fun in the workplace – after all, a job is what you make of it. Make Their Day! Be Present! Have Fun! Choose Your Attitude!</p>	

Figure 4 - Employee Defined Core Values

Defining our progress came with the first results from an Organizational Brilliance Survey (1) completed in September 2008 by 84% of our staff. This measured the perception of progress towards being the Best in Class aligned to the NMBQA criteria. The survey compared the perceptions of leaders and managers to those of our staff to ascertain gaps in processes. Several key areas for improvement were identified: two-way communication, and employee engagement and empowerment led the list, followed by a need for systematic processes and measurement systems.

The TCO recognized there was much work to be done to tap into employee motivation and engagement. We began with soliciting ideas from staff which resulted in suggestions that were un-aligned to our direction, but provided us with information on the success of our cascading methods. Daniel Pink’s concept that creating a sense of autonomy and mastery to a task can turn work into play through intrinsic motivation helped us recognize that sustaining enthusiastic and energetic employees was a long-term strategy requiring managers to delegate and empower.

Consistent, clear, and strategic messaging has enabled communication and transparency. We use our *Action Learning* approach to ensure understanding and clarity from level to level. The use of systematic methods combined with purposeful messaging has created the vehicle to keep the lines of communication open. This assisted leaders and managers in honing communication skills; however, did little to address active listening and two-way communication. The value of sustainability and constancy of purpose would be severely limited without a method to keep the conversation alive and meaningful. Our strongest tool came from benchmarking against other organizations. In support of innovation we researched the Ritz-Carlton, as providing the “memorable” experience and Baptist Health Care, the company that strives to create a culture of “WOW”. We learned the more information your staff has, the better they understand the

elements of your culture, the goals and the value of their contribution. To accomplish this, we invoked Al Stubblefield’s mantra of “Communicate! Communicate! Communicate!” (2)

We begin each day with a Stand Up Meeting (SUM) designed after a ship’s itinerary as a way of informing our staff and reinforcing our Mission, Vision and Values. It is our principle method to sustain understanding through employee-led presentations. One day of each week is designated as Value Day, where employee names are randomly selected to present the week’s message. This has grown into employee-created simulation games, puzzles, treasure hunts, and skits complete with parodies of songs to explain our culture and share knowledge. Some examples include “Fish is How We Do It” adapted from singer, Montel Jordan’s This is How We Do It”, “Taxman” from the Beatles and even a value-driven version of the Twelve Days of Christmas sung by all employees. Staff have also developed ten-minute videos to share new improvements and changes, which can be simulcast at all locations.

Our *Intention* meant revising our course of delivery to simplify and align our communication tools, ever mindful that everyone is affected and inclusion brings ownership. Policies are being re-written into PowerPoint slides that include links to values, process maps, and understandable Frequently Asked Questions. The Policy Page has been re-named “The TCO Navigation Log” to promote Welcome Aboard, through Smooth Sailing, and Departures of Fond Farewell. Long policy numbering systems have transitioned to easy-to-identify file names, searchable indices, and file structures have been tailored for consistency.

Cross-functional and business-focused teams along with information sharing are fast becoming the method for breaking down the silos. Technology has made the geographic boundaries less daunting and more productive as weekly *WebEx* collaborative meetings facilitate discussion of similar business issues, driving towards more consistency in process and review. Opportunities to share new methods are being provided through interactive video available through the web and simulcast. Each year, all offices close for a day to bring *all hands on deck* to our in-service training. The coursework is delivered using our purposeful cascading down methods to strategically address our current business gaps and build capability at the same time. Year 1 provided communication of our Mission, Vision and Values through employee-generated skits and programs and Year 2 focused on providing the big picture view of the Office through process focused strategies delivered by staff.

Even our titles now reflect our FUN culture, designed and selected by each person in their position with the intent of raising awareness with others about what we do (learning the mission) aimed at creating a “buzz” of engagement and passion about who we are. All SLT members have titles without “boss” terminology in them, and all professional staff members have developed fun, nautical or quality terms around their monikers. The Help Desk Technician became the Tech-Media Dude, our Training Manager is known as the Learning Navigator, while our Public Relations Coordinators have titles of Civic Engagement Ambassador and Connoisseur of Creativity.

P² The Process – System Development and Design

The TCO set out to map the high level process, our own Flow Diagram or the 50,000’ view of the Office, arranged as a SIPOC, to begin to describe who we were and what, *really*, was our business. It would

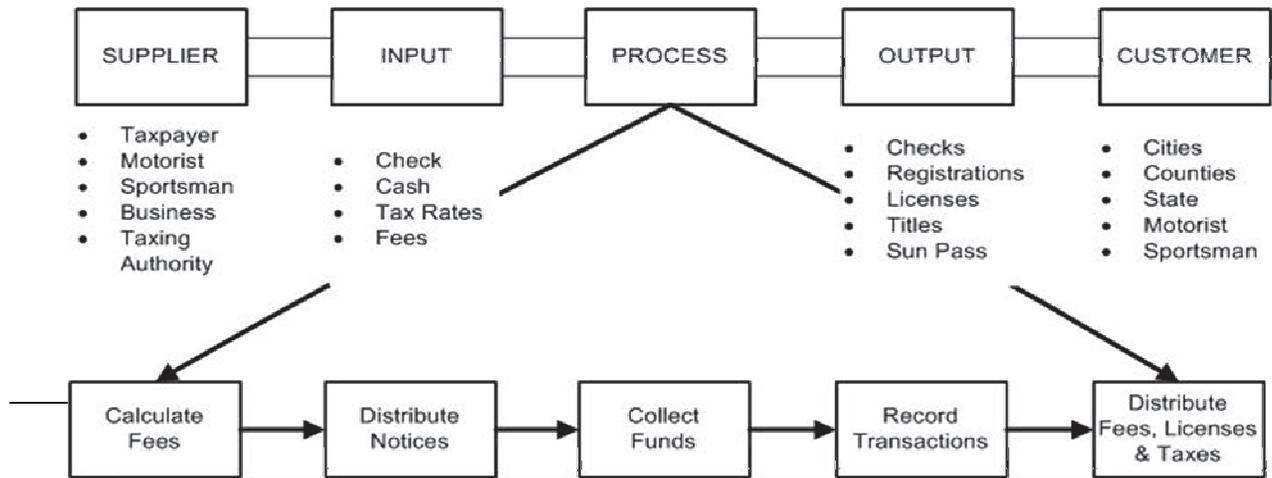


Figure 5 - TCO SIPOC

become our very first Process Map. We had always described our business as “providing service” but soon discovered that our view for long-term planning would shift as we struggled through our current state analysis using the profile for the NMBQA criteria. The different perspectives of the TCO were revealed, as were the strengths and weaknesses. It soon became clear, we had no idea where we stood, as we had no measures. It was simply our way to quickly redo work as soon as an error became apparent. In our view, this made us agile and responsive to corrections as we researched and made “just-in-time” changes. Equally as strong, was our view of our client’s needs. The Florida Statutes described our work and feedback from clients seemed redundant and unnecessary. We were also very aware of the cycles of the tax collection season and felt strongly that our biggest obstacle was also our greatest reason for taking the short- term annual view that “we were different” and driven by forces of the State law which were outside of our control.

Strategy Development

The TCO began to look at reaching the vision from a strategic point of view, trying to address those gaps standing in the way of UN-government service delivery and efficient streams of work in progress. Hoshin planning models were used in Year 1, as a method to gain input from staff given the lack of metrics on performance at any level. This merged with John M. Bryson’s model on governmental strategic planning used by the City of Charlotte, North Carolina.

The focus of early efforts pointed to creating systematic processes around core functions while developing a consensus-based current state, collectively identifying key success factors, staff competencies and information vital to our survival along with brainstorming emerging ideas and questions. Lacking data and analysis, the TCO used Bryson’s Litmus Test to identify strategic issues which defined our choices based on factors such as, linkage to mission and vision, scope of impact, funding, and ability to implement. Using a priority matrix, several key issues arose and our selection of strategies revolved around the importance to the Office relative to our Vision and Mission.

Those were:

- How might we become operationally excellent given we have a responsibility to perform in the most efficient manner?
- How might we maximize business opportunities that expand revenues and recapture lost business as taxes decline and the economy slows down?
- How can the TCO improve its service to clients and become service excellent?
- How do we create an enthusiastic and high-performing workplace?
- How do we identify new technology and integrate existing technology in order to become technologically world class?

The probing of these questions became the basis of our balanced scorecard and the beginning of meaningful measures: The 4 Es.

- E1: Exciting the Client to provide a surprising, personalized and seamless service delivery,
- E2: Exceeding Operationally to become the benchmark in all our processes,
- E3: Expanding Resources to aggressively pursue all available fees and revenues for the good of the citizens, and
- E4: Energizing Employees to create a staff of empowered, appreciated and excited employees.

While not yet measured, the realization of the impact of not instituting training programs, defining processes designed to eliminate re-work, maximizing innovation and technology and openly communicating to our staff and partners had begun to take on serious consideration in the workplace.

To build Constancy of Purpose, our long-range planning efforts meant seeing our process cascade down, allowing capabilities to grow and increasing skills. Year 1 focused on the development of processes with the SLT as action plan owners and communicators of the plan; Year 2 grew to teams of managers focusing

How the TCO Rates Enthusiasm!

- Excellent = The interaction made my day, made my experience memorable or fun, and called me by my name.
- Good = Staff was friendly and used my name.
- Only Fair = Staff was courteous but didn't use my name.
- Poor = The experience was disappointing or unmemorable.

How the TCO Rates Timeliness!

- Excellent = The amount of time was quicker than I expected.
- Good = The amount of time was what I expected.
- Only Fair = It took longer than expected.

on the development of processes for each of the 4 Es with employee involvement in action plan presentations and Year 3 will focus on departmental plans. Each year, processes and plans are reviewed for approach, implementation and execution effectiveness. For example, the Balanced Scorecard was created in Year 1; the first key metrics linked to team performance were developed in Year 2. Year 3 marks the beginning of measurement using standard deviation as the shift to controlling processes by managing variance and supported by development of Departmental Dashboards. It was critical to our success to build measures that involved team action, rather than quotas for workload, yet it was also as important to eliminate fear of statistics and numbers as capability grew; therefore, we had to approach this gradually and with patience.

Defining Measures

One of our most critical advances has been the process of building teams. This approach has facilitated the breakdown of departmental barriers, but it has also been at the core of innovation and creativity. Team structures were designed to lessen fear and encourage questions, and taking issues to their source, much like problem solving methods. Recognizing the work of teams has surpassed individual recognition, and has replaced the annual performance evaluation systems. For the first two years, client satisfaction surveys have been commissioned to determine if our clients satisfaction ratings fall in the "excellent" category, and if so, additional pay incentives are provided for all members of the department equally, for the work of one is dependent upon the work of all staff, working together to provide the UN-government Experience. From Year 1 to Year 2, the bar was raised to keep up with rising client and cultural expectations, and teams of employees were established to keep levels high. Pay incentives are only provided for the highest of ratings and the overall rating of excellence exceeds 64% of our clients. The definition for excellence is in alignment with our E1: Exciting the Client description of providing seamless, personalized and surprising service with a focus on Enthusiasm (Did we make their day?) and Timeliness (Were we quicker than expected?). The value of the "happy" client was at one time considered immeasurable, and our next step in the process is to practice asking our clients and each other, "what will it take to make your day?" centered around our *Intention* to own our process of service delivery.

The shifting of the culture had not yet touched the new philosophy to be excellent in all our processes and in our service delivery. Measurements and process development were considered an unnecessary activity that appeared to add more work to the day-to-day tasks. As managers had previously worked diligently to correct any and all errors, the cost of re-work was viewed as simply a part of the job. The errors that were officially documented amounted to only 4% of the workload and staff believed the amount of time lost making and correcting mistakes was miniscule. Our approach was as Deming describes, "the old way: Inspect bad quality out." and we were moving towards "the new way: Build good quality in." (3).

The Balanced Scorecard has all metrics identified and aligned to the 4Es, complete with processes to identify, select, collect, and analyze data and information. Using our cascading *Action Learning* process, our Process Navigator, Project Synergist and Performance Mensa have been working with senior leaders and managers to identify specific, actionable measures that matter, one department at a time, building capability by enabling learning. Not all measures are in place; however, they are to be process-driven, and primarily expressed as a percentage of achievement or of variance to the expected performance. Figure 7 – The TCO Balanced Scorecard displays the Executive Summary Level (those indicators in place are highlighted in blue). The summary drills down to the operational levels with cascading detail to the team level.

The TCO Balanced Scorecard			
E-1	Exciting the Client	E-2	Exceeding Operationally
	by providing a		by
E-3	Expanding Resources	E-4	Energizing Employees
	by		by creating

surprising, personalized and seamless service delivery	becoming the benchmark in all our processes	aggressively pursuing all available fees and revenues for the good of the citizens	a staff of empowered, appreciated and excited employees
% of Clients Rating TCO Excellent Overall % of Clients Rating Waiting times as Excellent	% of Accuracy % of Cycle Time Exceeding Standards % of Process Adherence Continuous Improvement Gains % Action Plans Completed Timely	% of Available Revenue Captured New Revenue Growth in \$\$'s	% of Employees Demonstrating Teamwork % of Employees Recognized % of Employees Enthusiasm Levels Rated Excellent Overall

Figure 7 - TCO Balanced Scorecard

P³ The Performance – Maintaining Excellence

“We are what we repeatedly do. Excellence, then, is not an act but a habit.” – Aristotle, and as such, the TCO has instituted a focus on continuous improvement, beginning first with the process that supports problem-solving and team-building based upon fact-based decision making. Or, a more often used Deming quote at the TCO, “In God we trust, all others bring data” (4). The focus on improvement lies at the core of our values of professionalism, creativity, fiscal responsibility, and communication. We embedded improvement as a part of everyone’s job, to look for opportunities and embrace the challenge to make things better. Building and sustaining capability required vast amounts of training, practice, follow-through and accountability. Training had to shift from a one-time classroom event to a longer *Action Learning* program in leadership, supervision, teamwork, and problem-solving, followed by principles of self improvement through 360° feedback and continuous improvement cycles.

Continuous Improvement Methodology

The TCO has adopted “Knowledge Based Leadership – Fact Based Decision Making” as the continuous improvement method. Developed with the use of an external/internal partnership, the method is delivered as an experiential set of training modules designed to introduce the basics of Six Sigma, teamwork, client-driven excellence, and accountability for implementation of innovative solutions. Our external partner in facilitation of the course is using this year to train the trainer as our staff transitions as facilitators. Teams of 3 to 4 persons from different work areas meet in class once a month for six months and resolve a pressing work issue that can be measured, analyzed and controlled. Project work involves meetings outside of class sessions to foster teamwork and autonomy in decision making with the assistance of a coach and SLT sponsor. All leaders, managers and supervisors were the first to attend and work on projects; fulfilling their role to lead by example and practice the methods and constantly look for ways to improve work processes. Since 2007, employee-led teams (118 employees out of 240) have worked on projects saving over \$5 million in productivity and direct savings. Project selected was limited to opportunities where data analyses are possible and chosen by the employee teams. The largest gains support the principle that focusing on improving the entire process is more advantageous to an organization than modifying a portion of the process. For example, changing a portion of the automated phone system increased productivity by \$10,920, while teams working on reducing waste and re-work generally improved productivity or increased revenue in the \$100,000 range.

Team	Savings	Team	Savings
<i>Ghostwriters Team</i> Improving the Correspondence System	\$37,516	Pony Express Reducing Returned Tax Bills	\$64,215
Team FeMail Carriers Reducing return DMV mail	\$24,376	Team Time Redesigning Tax Bill	\$12,215

Fearless Femmes Team Improving IT Help Desk Ticket Handling	\$10,800	The Redeemers Streamlining Tax Deed Process	\$148,285
Q-Flow Quest Team Establishing Service Time Standards	\$3,504,468	Void Patrol Reducing # of Voided Transactions in DMV	\$105,974
King and 3 Queens Team Improving Portion of Automated Phone System	\$10,920	Team Origami Reducing Paper Usage	\$691,336
Team Rise & Shine Bringing Consistency to Opening Process	\$71,801	A Real Terrific Foursome Reducing Errors in Business Tax	\$11,605 + Revenue of \$166,347
Apprentice Team Redesigning Web Payment System	\$1,136	Resource Rangers Improving Enforcement	\$3,963 + Revenue of \$143,719
Team TCI Streamlining Error Handling Process at Service Centers	\$131,723	Senior Leader Team Improving Client Service at North County	\$17,389

Figure 8- Sample of Team Savings

The Captain OFIE process – **O**pportunities **F**or **I**mproved **E**xcellence is a more simplified problem solving method developed to allow formation of department specific teams. The Captain represents steering and ownership by the team. Employees are introduced to empowerment and autonomy to make changes, and experience the power of continuous improvement. It is our goal to energize staff, enhance skills, and instill pride of workmanship using beginning quality tools and brainstorming. Ideas generated from these teams have opened up lines of communication, found ways to delight clients, and eliminated unnecessary process steps in all work areas. Both methods and solutions are deployed through the use of team presentations, cascaded down, first to the SLT, then the managers and, if necessary, as a system-wide video or in-person road show, and sharing knowledge and team accomplishments.

The TCO has taken a holistic approach to developing employees and fostering an environment of individual, group and organizational growth. The approach is an adaptation of Peter Senge’s Learning Communities as introduced in “The Dance of Change” and personal succession planning practices. As critical mass is achieved, employees use and apply their skills and knowledge, now out of habit. The motivation takes on a level of importance because it matters to them, to their peers, and then to the organization. The Leadership and Management Team provide the *Intention* through direction and make learning a priority through various opportunities to learn and practice in the workplace.

The TCO adaptation of Senge’s work defines the employee in a Life

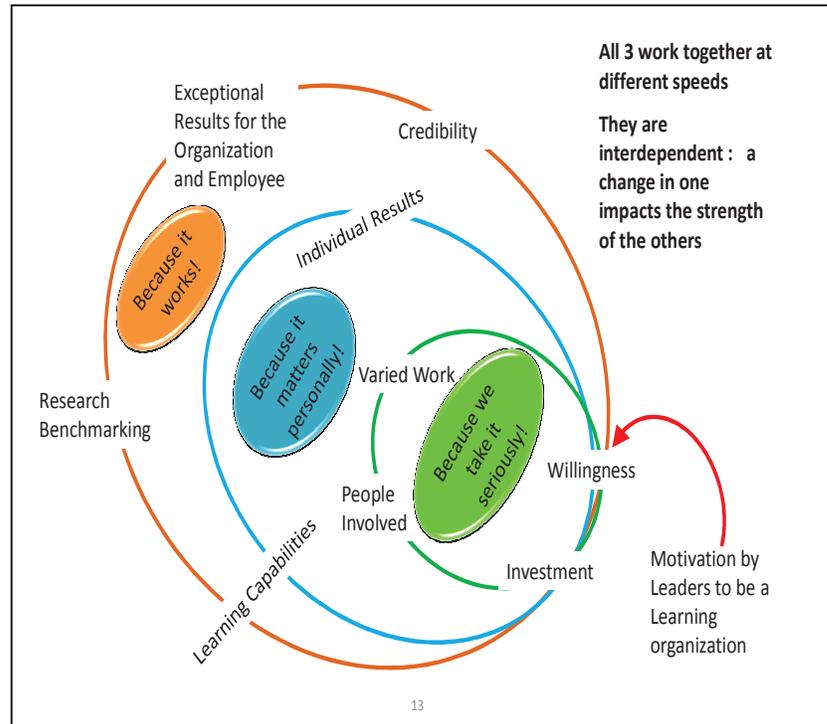


Figure 9 - Senge's Learning Community for TCO

Cycle of growth working interdependently with the entire organization to develop a unified staff of learners through a series of maturing on-the-job training cycles.

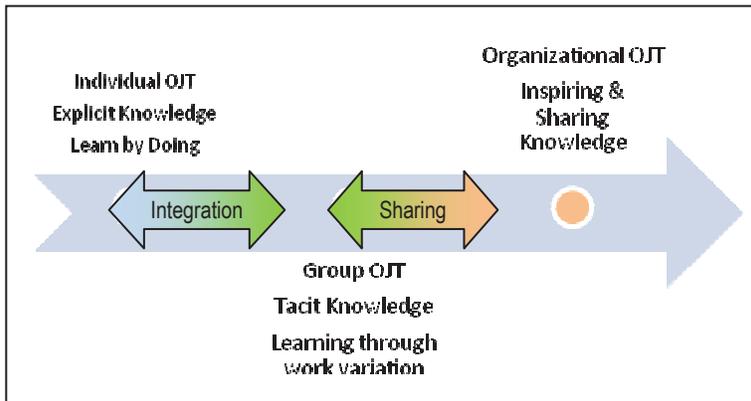


Figure 10 - TCO Employee Life Cycle

New employees spend most of their time acclimating to new processes and gaining explicit knowledge, while assimilation continues to occur over the course of their career with different opportunities to learn and share. Methods to achieve learning beyond the standard orientation and on-the-job observations have taken shape as cross functional training groups, quarterly Client Ambassador training after an initial “Eight Flag Regatta” training. The Regatta represents

the beginnings of the Organizational OJT defined around our core roles and competency levels and introduces specific coaching skills, including conflict resolution and excellence in providing the memorable experience to clients and co-workers.

The TCO identified six core roles and competencies designed to promote intentional learning through the employee life cycle. Four of the roles (Active Learner, Attentive, Resourceful Practitioner, Inspired Solution Seeker, and Model Collaborator) are required for all staff and two additional are required for all senior leaders and management (Trusted Guide and Outcome Facilitator). Each of the roles has three levels of competency, at the Individual, Group and Organizational levels.

Competency Role	Level 1 - Individual	Level 2 - Group	Level 3 - Organization
Action Learner seeking opportunities for growth	Systematically Manages Learning	Seeks Growth to expand skills	Enables a Learning Culture
Attentive Resourceful Practitioner possessing technical job skills	Displays Sound Knowledge	Has Cross Functional Knowledge	Encourages and Shares Knowledge
Inspired Solution Seeker identifying alternatives, options and new ways	Thinks Creatively	Makes Sound Decisions	Champions Innovation
Model Collaborator living the values and embodies professionalism	Participates as a Team Member	Functions as a Team Leader	Inspires a Team Environment
Trusted Guide creating a rich, nurturing work environment	Capable Trainer	Skilled Coach	Active Mentor
Outcome Facilitator performing as an “UN-government” leader achieving the 4Es	Focus on Exciting the Client and Staff (E1 and E4)	Focus on Results (E3)	Commits to Being the Benchmark (E2)

Figure 11 - TCO Roles and Competencies

Having our employee competency requirements identified has led to attitude and skill-based hiring assessments. Each applicant completes a placement report relative to the job description to determine proficiency and perspective on providing the level of service and skill as defined by the TCO. This 150

question assessment compares eight behavioral characteristics for the degree of alignment to our culture. Only those potential applicants with high matching scores are considered for further interview. Specific interview questions are provided by the assessment to drill deeper into the applicant's motivation outside the desired job match pattern. This allows the TCO to reduce turnover because attitude has become our key driver in successful service delivery. The placement report is also required for any current employee seeking advancement to assure alignment at the management levels and identifies opportunities for improvement to assist in employee development.

Leaders and managers are piloting the use of Individual Development Plans (IDP) as a method to self identify opportunities for growth in any of the levels with the assistance of a 360° feedback assessment (LPI 360). The TCO uses the *Five Practices for Exemplary Leadership* developed by James M. Kouzes and Barry Z. Posner as the practices represent the benchmark behaviors for leaders and provide workbooks for self development. The five practices have been integrated into the six TCO competencies (roles) and provide the template for growth. Developing the IDPs encompasses our commitment to *Action Learning* and to the achievement of our *Intention* to own the quality of processes and services. It embodies our systematic approach to be purposeful, patient and develop a passion for our work. Each step requires open communication with peers and staff members to share sometimes painful results, but in the end begins to diminish the fear that may stand in the way of exponential growth, for the individual and for the TCO. The peer review also serves to break down barriers and build accountability as well as a strengthened learning community. Most importantly, the IDP serves as the foundation for skill development towards adopting the new philosophy of excellence.

Conclusion

The Journey to the UN-government Experience is still in its infancy, but steadfast progress is being made, purposefully and patiently, building a passion for the quality of our work. Each of the approaches strongly links to Deming's Fourteen points and runs counter to most of the Deadly Sins. Our emphasis is on innovative excellence through a sharp focus on our *Intention*. We have eliminated evaluation and merit

ratings, we have assessed and sought to develop our managers rather than have them transition to other organizations. We measure what matters and drives improvement, and we focus on the long term view – sustainable and constant. We align our decisions to our Mission and our Vision and we live by our Values, we train, we communicate, and most important, we take action and patiently take baby steps to sustain Constancy of Purpose.

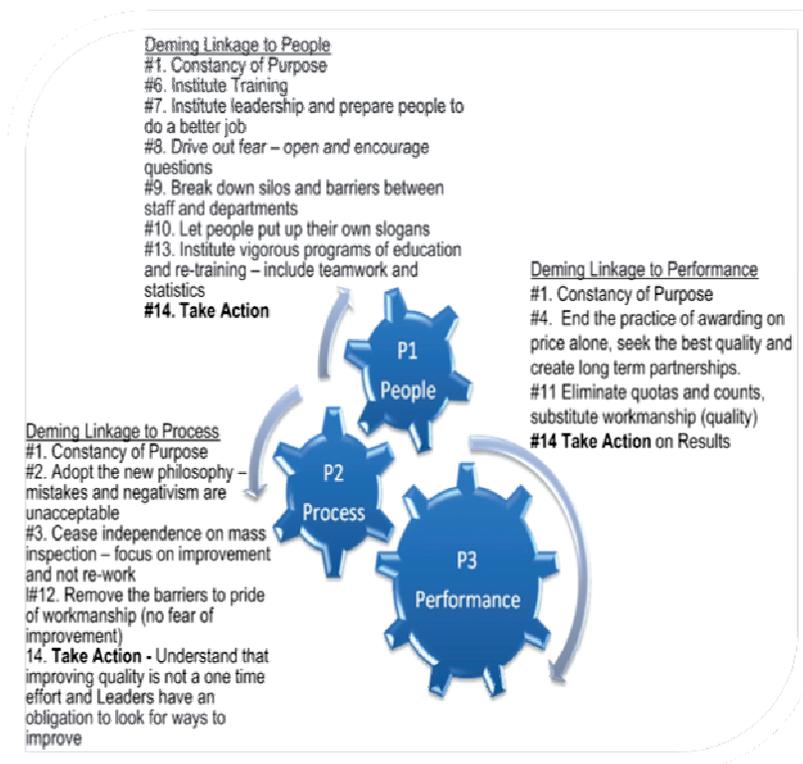


Figure 12 - TCO/Deming Linkage

Endnotes:

1. Trina Pulliam, Organizational Brilliance Survey (Trainnovations, 2008)
2. Al Stubblefield, *The Baptist Health Care Journey to Excellence, creating a culture that Wows!* (John Wiley & Sons, Inc, 2005), p 51.
3. Mary Walton, *The Deming Management Method* (The Putnam Publishing Group, 1986), p 60.
4. Thomas Davenport and Jeanne G. Harris, *Competing on Analytics: The New Science of Winning*, (Harvard Business School Publishing Corporation, 2007), p 30.

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AN EXAMINATION OF THE RELATIONSHIP BETWEEN ONLINE COLLEGE STUDENTS' RATINGS OF ONLINE COLLEGE INSTRUCTORS AND THE PREFERRED CONFLICT MANAGEMENT STYLE OF ONLINE COLLEGE INSTRUCTORS

Brian C. Collins
Doctor of Business Administration – Management, Candidate
Argosy University
briancollins37@hotmail.com

Introduction

Conflict management has become an issue of increasing significance within business literature (Rahim, 2000). Specific types of communication yield different issues within conflict management. Specifically, asynchronous communication is likely to present conflict management challenges that are less pressing in other communication forums (Dana, 2001). Online higher education has become an education media with unprecedented growth, a significant impact on higher education, and a need for additional development to meet additional educational needs (Flores, 2007).

Many styles of online education exist however; Flores indicates that asynchronous online education is very prevalent. Surveys of students, from all delivery modes of online education, have been used to evaluate, improve and rate collegiate instructors (Hornbeak, 2009). Student ratings of instructors allow colleges and universities to evaluate course outcomes as well as student perceptions of their instructors. The advancement of asynchronous online higher education, the significance of conflict management and the challenges associated with managing conflict within asynchronous communication present a need to research the relationship between online college students' ratings of online college instructors and the preferred conflict resolution style of online college instructors. Established conflict management assessment tools and existing assessment tools used when asking students to rate their instructors will provide the opportunity to better understand conflict management's impact upon student satisfaction within online higher education.

Introduction to the Problem

Conflict management has become an issue for all organizations to address (Dana, 2001). While conflict management issues exist within all organizations, Dana reports that asynchronous communication is one of the most challenging environments in which conflict can be managed. The development and expansion of online education has allowed collegiate students from many geographic locations to benefit from asynchronous online higher education (Flores, 2007). Online collegiate instructors are challenged to maintain acceptable levels of student ratings to assure teaching appointments, receive promotions, or achieve tenure (Hornbeak, 2009). The rapid growth of online higher education has allowed students from varied locations and non-traditional demographics to attend college courses. The unique convergence of non-traditional college students within an asynchronous online learning environment and the importance of instructors maintaining high student ratings ensure that instructors and collegiate institutions have an incentive to understand variables that may impact students' ratings of online collegiate instructors. As online learning has grown, research associated with online learning methods has been conducted however specific examinations related to instructor-student conflict are limited. Additionally, research associated with student ratings of collegiate instructors has given minimal attention to the actionable variables that may influence the ratings.

The rapid growth of a new educational media requires educational organizations to understand the expectations and needs of online students compared to traditional on-ground students. Many online educational institutions have challenged traditional on-ground instructors to teach online courses (Wright & Hugué, 2008). The format of asynchronous online learning is very different from that of lecture based on-ground courses. The skills required to teach online courses differ from traditional on-ground courses. Online instructors and online students may have different needs. Conflict management tactics within asynchronous environments require very specific skills that few business practitioners have (Dana, 2001). While business researchers have revealed the specific needs of managing conflict within asynchronous communication, educational researchers have yet to address the specific needs of asynchronous learning in relation to online learning.

Such a gap in research in conjunction with a rapid expansion of online learning presents a significant problem for educational organization, students, and industrial actors reliant upon students educated via online learning. The unique opportunity for online education to attract non-traditional collegiate students and the lack of research associated with managing conflict management within asynchronous online learning has the potential for non-traditional students to experience higher levels of instructor-student conflict when compared to traditional students taking on-ground courses. Non-traditional students are more likely to have less time and more distractions. Failing to address possible influences of conflict management within student satisfaction with their instructors may lead to additional conflict for the students who least can afford distractions within their studies.

Failing to understand conflict management within online higher education courses presents a problem for academic affairs departments challenged with addressing escalated issues from online courses. When instructors and students are unable to communicate effectively, the potential for students to escalate complaints of their instructors will increase (Harrison, 2007). Resources devoted to online education have increased however; escalated issues that result from improper conflict management techniques present a problem for institutions attempting to use online courses to minimize costs associated with additional classrooms. Additionally, conflict mediation with students located in geographic locations that are not near the physical campus present additional problems. Dana (2001) reports that same place and same time communication is optimal for conflict mediation. When students are geographically distant and potentially time shifting their education, mediation becomes more challenging. Conflict management theory presents that the cost of prevention is much more valuable than mediation (Montoya-Weiss, Massey, & Song, 2001). Conflict management within online higher education presents a clearly defined problem for educators, students and industry participants.

Online instructors are expected to maintain high student ratings within their online courses. While online educational institutions expect their online instructors to maintain acceptable student ratings, online instructors are offered minimal formal tools that have been empirically proven to raise ratings from students. Online collegiate instructors who are unable to improve their student ratings from their mentors' or department chairs' feedback will experience a problem when attempting to improve their student ratings. Albano (2006) revealed challenges within new or changing course enlivenments related to classroom assessments. Online educational instructors should be provided with a clear understanding of instructional and communication expectations of online students. Understanding conflict management mode's impact upon student ratings of online college instructors will provide potential collegiate instructors with data revealing any possible relationship, or lack of relationship between an instructors' preferred conflict management mode and student ratings of their instructors.

Background of the Problem

Flores (2007) examined issues surrounding the creation and implementation of quality initiatives within educational organizations. Specifically, online teaching methods should be examined, understood, improved, and re-examined within a continuous improvement loop. Deming (1993) called for business practitioners and educators to use statistical methodology and continuous loops of planning, doing, studying, and taking action. Online higher education has existed for more than a decade. Conflict management has been examined for many years. Conflicts within education have been examined however; research specific to managing conflicts between students and instructors within online collegiate classrooms have not received appropriate academic research. The problem associated with understanding online instructors' ability to manage conflict with students through online educational media can be traced to asynchronous distance education methods that pre-date online education. The evolution of online education has allowed asynchronous educational methods to rapidly expand and the scope of this problem has increased.

Human development personal conflict management issues can be found in written literature pre-dating modern times (Dana, 2001). Modern conflict management research is typically traced to the work of Douglas McGregor's. McGregor's work with Theory X and Theory Y was developed in 1960 (Wade, 2007). Many modern conflict management assessment instruments cite McGregor's theories. As conflict management has become a sub-set of business, education and other social sciences, the need to understand

the management of conflict within specific organizational settings has grown. Conflict management assessment tools allow organizational leaders to understand how individuals and groups of people are likely to handle conflict. Conflict management assessment tools also provide a mechanism for organizational leaders attempting to understand the impact of specific conflict management styles on dependent variables. Assessing individuals' preferred mode of dealing with conflict provides a standardized indication of the individuals' conflict style (Rahim, 2000). Rahim, Kraybill, Thomas and Kilmann, and the creators of the Myers-Briggs personality profiles have provided conflict management researchers with standardized tools for measuring conflict styles. Conflict management researchers can use these tools to quantify specific population's conflict management styles. Once a specific population's conflict management styles are understood, additional metrics can be used to understand the influence of conflict management on the additional metrics.

Student ratings of instructors have been used to evaluate collegiate instructors for promotion, tenure, course placement, and general human resource functions (BrckaLorenz, 2008). Evaluations of online instructors have mirrored that of on-ground collegiate instructors however; the forum for surveys has changed. Also, online collegiate course evaluations eliminate some external factors that may impact traditional course evaluations, such as visual impressions of instructors' physical appearances. Student ratings of instructors have become important metrics for online educational institutions and instructors are expected to maintain adequate student ratings. While instructors are tasked with receiving high student ratings, minimal academic literature addresses how instructors' actions impact such scores. Understanding how instructors' student ratings vary based on specific variables will allow collegiate institutions to use such data when developing their instructors and when evaluating how students respond to educational methods.

Online college instruction is a quickly growing subset of the education industry. Student ratings of instructors will become more important as online educational organizations expand in scope and scale. Conflict management must be addressed within all organizations (Dana, 2001). Online education impacts a majority of college students (Rutherford, 2007). Collegiate institutions continue to use student ratings of instructors as a mechanism for evaluating instructor effectiveness, student outcomes and student satisfaction (BrckaLorenz, 2008). This study will examine online college instructors' preferred mode of addressing conflict and the impact of specific conflict management modes on student ratings of online collegiate instructors.

Statement of the Problem

The problem related to this study is: As online education has grown, student ratings of online instructors have been measured however; minimal research has attempted to isolate variables that may impact student ratings. This study will attempt to determine if the preferred conflict resolution mode of online instructors has a relationship with students' ratings of online instructors. Current faculty hiring, training, and measurement tools do not address conflict resolution. Online instructors are expected to receive positive student evaluations however; few tools are available to show what causes, that can be altered, influence such scores. Understanding a possible relationship between students' ratings of their online instructors and the preferred conflict resolution style of the instructors will reveal a possible relationship between conflict resolution style and students' ratings of their instructors. Should a relationship be revealed, conflict resolution style may be a variable impacting the success of online instructors. Should the research reveal no relationship between specific conflict resolution profiles and student ratings, additional variables should be isolated to better understand what influences student ratings of online instructors. The current lack of research tying conflict management styles, online education, and student ratings of online collegiate instructors presents a problem that will be addressed with this study. The problem identified impacts institutions of higher education, current collegiate students, potential collegiate students, collegiate instructors, collegiate administrators, tax payers subsidizing college tuition, employers hiring college graduates, and communities impacted by institutions of higher education. This study will address the stated problem by conducting research providing an understanding of the possible relationship between online college instructors' preferred mode of dealing with conflict and students' ratings of their online college instructors.

Purpose of the Study

Organizational development challenges leaders and practitioners to promote continuing growth associated with improving employees and service to the client. Educational institutions place value on student ratings (Burchert, Laws, Apperson, & Bregman, 2008) however; this writer has found minimal literature referencing specific practices to improve student ratings. Online education challenges students and instructors to interact without the benefit of face-to-face interaction and rarely the benefit of phone communication. Resolving conflicts between students and instructors presents specific challenges (Harrison, 2007). Conflicts are best resolved through communication that occurs at the same place at the same point in time (Dana, 2001). Communication that occurs from different locations at different times presents the most challenges when attempting to resolve conflict (Dana). Resolving conflicts between online students and online instructors presents added challenges due to the asynchronous communication style typically used in online education. Qualitative and quantitative student ratings of instructors have become an accepted format to assess college instructors (Silva et al., 2008). Understanding the relationship between the conflict resolution style of instructors and student ratings of instructors presents an occasion for online educators to better direct hiring and training efforts. The specific problems associated with resolving conflict between online students and online instructors require research to understand a possible relationship between instructor ratings and instructors' self-rated conflict resolution styles.

This study will reveal if a relationship exists between online college instructors' preferred mode of dealing with conflict and students' ratings of their online collegiate instructors. Specifically, the Rahim Organizational Conflict Instrument (ROCI) II will be issued to online college instructors revealing their preferred mode of dealing with conflict. Online college instructors will be segmented into five modes of conflict management: integrating, obliging, dominating, avoiding, and compromising (Rahim, 2000). The segmentations of instructors will have their Individual Development and Education Assessment (IDEA) Center student survey scores examined. The researcher will use statistical tools to determine if a statistically significant relationship exists between conflict management modes and student surveys. Additionally, each of the five conflict management styles will be examined for strength of relationship between IDEA scores and ROCI II scores. Finally, specific categories of the IDEA center survey scores will be examined to determine if specific ROCI II modes related to sub-categories of student surveys of their online college instructors.

Research Question and Hypotheses

The research question will be as follows: Is there a relationship between online college instructors' preferred conflict management style and students' ratings of online college instructors? Is there a specific conflict resolution profile, for online college instructors, yielding a significant positive relationship to online students' ratings of instructors? Do specific sub-categories of student ratings relate differently to specific conflict resolution profiles?

Hypothesis 1: There is no statistically significant relationship between student ratings' of online college instructors and online college instructors' preferred conflict resolution style.

Hypothesis 2a: There is no statistically significant directional relationship between student ratings of online instructors and the avoiding conflict resolution profile.

Hypothesis 2b: There is no statistically significant directional relationship between student ratings of online instructors and the compromising conflict resolution profile.

Hypothesis 2c: There is no statistically significant directional relationship between student ratings of online instructors and the dominating conflict resolution profile.

Hypothesis 2d: There is no statistically significant directional relationship between student ratings of online instructors and the integrating conflict resolution profile.

Hypothesis 2e: There is no statistically significant directional relationship between student ratings of online instructors and the obliging conflict resolution profile.

Hypothesis 3a: There is no statistically significant relationship between IDEA survey categories and the avoiding conflict resolution profile.

Hypothesis 3b: There is no statistically significant relationship between IDEA survey categories and the compromising conflict resolution profile.

Hypothesis 3c: There is no statistically significant relationship between IDEA survey categories and the dominating conflict resolution profile.

Hypothesis 3d: There is no statistically significant relationship between IDEA survey categories and the integrating conflict resolution profile.

Hypothesis 3e: There is no statistically significant relationship between IDEA survey categories and the obliging conflict resolution profile.

The above listed hypotheses will be used to test the stated research questions. The IDEA Center student survey tool will be used to quantify student ratings of online instructors. The Rahim Organizational Conflict Instrument (ROCI) II will be used to quantify online college instructors' preferred mode of addressing conflict. Online college instructors will be asked to complete the ROCI II instrument, return the results to the researcher, and grant permission for the researcher to have access to their IDEA scores for a specific course term.

Theoretical Framework

This study will be guided by several multidisciplinary theories. Rahim's (2000) theory of conflict management suggests that individuals and organizations can quantify an individual's preferred style of managing conflict. Once an individual's preferred style of managing conflict has been identified, individuals and organizations can use this information to hire, develop, and promote organizational actors. Ultimately, an organization can use Rahim's theoretical framework in conjunction with additional data to quantify the impact of conflict management styles upon other quantifiable metrics.

Additionally, this study will be guided by the IDEA Center's student rating metric and assessment instrument (Albano, 2006). The IDEA Center's instrument is based on higher education assessment theories that allow institutions of higher education to assess their faculty, course success, and course outcomes through surveys of students.

Finally, this study will draw upon the systematic approach to business and education developed by Deming (1993). Deming's system of business and management encourages organizational leaders to use quantitative methods to understand common causes of variance and special causes of variance. Deming's theory places value on an organization's ability to understand the true causes of variance. Once the causes of variance have been identified, an organization can attempt to address the barriers to organizational success. Online educational organizations encourage instructors to have high ratings from their students within course surveys. Online educational organizations also place value on minimizing conflict within online classrooms. While low levels of conflict are desired and high student ratings are desired, specific research related to quantifying these two metrics within the context of improving an online educational organization is lacking. This study will draw upon Rahim's theory of conflict management, the IDEA Center's course evaluation theories, and Deming's systems theory to quantify conflict management's impact upon online higher education course surveys.

The focus of the study will be to examine a the gap of literature that exists between organizational conflict management assessment, student assessment evaluation, and the creation of a systematic approach for examining and addressing organizational improvement initiatives. The current gap of research will be addressed through a survey of online collegiate instructor's preferred mode of dealing with conflict using the Rahim Organizational Conflict Mode Instrument (ROCI) II. Online instructors who participate in the study will agree to allow the research access to their IDEA Center student surveys from the most recent academic term. IDEA Center scores and ROCI II scores will be coded. Statistical methods will be used to

determine if specific conflict management styles have a directional relationship to student ratings of their instructors. Additionally, conflict management modes will be examined to determine if specific conflict management modes have a directional relationship with specific sub-categories of the IDEA Center assessment instrument.

Significance of the Study

This study will fill a void of academic literature between organizational management, conflict management, online education, and student assessments of collegiate instructors. When not correctly addressed, organizational conflicts can create additional direct and indirect costs for an organization (Dana, 2001). Online education is a segment within collegiate education that is becoming a part of most students' collegiate experience and becoming increasingly important within the landscape of higher education (Flores, 2007). Deming (1993) encourages business leaders and educational leaders to use systematic research approaches when improving processes. Understanding the impact of conflict management styles upon online higher educational student ratings of their instructors through the lens of a systematic approach to improving a process will significantly improve academic literature related to conflict management and higher education.

Theoretical relationships between conflict management style, student ratings of online collegiate instructors, and the development of a systematic approach to improving a process can be used to benchmark successful online instructors. Once a benchmark of successful online college instructors has been developed, preferred conflict management style may be a possible leading indicator of instructors' possible student ratings. Currently, student ratings are used as a lagging indicator of instructor, course and student success. Should a directional relationship, between preferred conflict management style and student ratings, be identified, preferred conflict management style may become useful when training online instructors and selecting potential online collegiate instructors. The rapid growth of online education creates a significant need for additional research related to online education and training. Conflict management is an existing field within business administration. Asynchronous communication increases the potential for conflict issues to be exaggerated (Dana, 2001). The use of asynchronous communication within online education, the importance of conflict management, and the growth of online education present a need for academic literature converging on these genres of business management and education.

This study will provide an opportunity for business practitioners to better understand the role of conflict management within asynchronous environments. This study will also allow collegiate educators to understand the impact of conflict management within online education. Specifically, collegiate educators will have the opportunity to understand how online collegiate instructor's preferred style of addressing conflict impact student ratings of their instructors. Understanding the impact of conflict management style on student ratings will allow collegiate administrators to better understand what weight should be placed on student ratings. Currently student ratings are used to determine course assignments, instructor promotion and faculty tenure. Understanding a potential directional relationship between conflict management and student ratings of online instructors will allow for conflict management style to serve as a leading indicator for student ratings, a possible basis for a training model and a baseline to better assess online collegiate instructors. Additionally, understanding the role of conflict management on student ratings of instructors will have the potential to impact Student Affairs investigations and academic literature. Ultimately, understanding how conflict impacts online learning will benefit educators, students, and industry participants who rely on higher education to train their future employees.

Nature of Study

The purpose of this quantitative quasi experimental study is to assess a possible relationship between student ratings of online college instructors and online college instructors' self reported preferred conflict management style. This study will specifically look at online college instructors' responses to the ROCI II survey instrument. Instructors who opt to take the ROCI II survey will also allow the research access to their IDEA center student survey scores. ROCI II responses will be coded into five possible preferred conflict management styles. Instructors' IDEA survey results will be examined to determine if a directional relationship exists between specific ROCI II conflict styles and student IDEA survey responses. Additionally, specific sub-categories of the IDEA surveys will be examined to determine if overall and specific categories of student assessments have a directional relationship to any of the five ROCI II conflict

management styles. For the purposes of this study, instructor ROCI II conflict management modes will be the independent variable and student IDEA Center survey responses will survey as the dependent variable. The independent variable will be examined to determine if a directional relationship exists with the overall dependent variable. ROCI II and IDEA survey responses will be coded and stripped of any information that could tie the data to an instructor or a student prior to the research beginning quantitative analysis. The ROCI II and IDEA survey data will be examined using the Statistical Package for the Social Sciences (SPSS) software.

Conclusion

This paper has presented the rationale for conducting research to examine a possible relationship between online collegiate instructors' preferred mode of managing conflict and online students' ratings' of their online collegiate instructors. Upon collecting data and analyzing a possible relationship between ROCI II modes and student IDEA scores, the researcher will draw conclusions of the importance of conflict management within online classrooms. Should a directional relationship be identified, institutions offering online courses will be able to use the ROCI II instrument as a training tool or a screening tool prior to assigning instructors to teach online courses. Additionally, should no directional relationships be identified, institutions offering online collegiate courses will know that ROCI II models do not drive student ratings of instructors. Institutions offering online courses will also have a better understanding of one influence of student ratings within online education. Institutions should fully understand the influences of an evaluation tool prior to using the instrument to make organizational decisions. Additional research associated with online education is strongly recommended as the advance of online education has been rapid and the research associated with this area of higher education should grow accordingly.

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WHAT WOULD DEMING SAY?

William J. Feuss
New York University Stern School of Business
wfeuss@stern.nyu.edu

The featured article in the November 2009 issue of *Harvard Business Review (HBR)* was “What Would Peter Say?” In this article Rosabeth Moss Kanter suggests what Peter Drucker would say about the present economic crisis. This author is currently drafting a proposal to HBR that asks the follow-up question, “What Would Deming Say?”

W. Edwards Deming and Peter Drucker were contemporaries at New York University. Initial research indicates that they held largely compatible views. In *The New Economics* Deming had already asserted that the United States had been in economic decline, not simply a recession, for three decades (Deming, 1994). This view is consistent with the classic article “Managing Our Way to Economic Decline,” by Robert H. Hayes and William J. Abernathy in the July-August 1980 issue of *Harvard Business Review*. Deming, however, formulated a prescription for recovery, tested it in Japan, and documented it in *Out of the Crisis* (Deming 1986).

The purpose of the proposed article is to bring Deming’s work to the attention of an influential audience at this critical time. The purpose of this presentation is to obtain feedback on the working draft of the article with the aim of ensuring that its assertions are faithful to the Deming philosophy. The author specifically requests the presence and comments of attendees with deep understanding of the Deming philosophy. (The slides from this presentation would be incorporated into the proceedings.)

IN SEARCH OF A THEORY FOR MANAGING ETHICAL BEHAVIOR IN ORGANIZATIONS

Brian Mickelson Gamble
Ethics Practitioners' Association of Canada
brianmgamble@rogers.com

The Need for a Theory

In this paper I argue that Dr. Deming's System of Profound Knowledge also constitutes a theory for managing ethical behavior in organizations. His 14 points imply that when universal values such as respect, fairness, loyalty, compassion and responsibility are present and seen to be present in management behavior, employees' commitment to integrity and continuous improvement are more likely to be evident.

The need for a theory to manage ethical behavior in organizations has perhaps never been more imperative to the wellbeing of businesses and individuals as it is today. The present crisis that is affecting the economies and businesses of many countries derived from a catastrophic collapse in confidence in financial institutions in the U.S. and elsewhere. Joseph Stiglitz claims the 2008 collapse uncovered "a pattern of dishonesty on the part those bodies, and incompetence on the part of policymakers" (1). Even prior to the 2008 collapse, difficulties and confusion about ethical issues were reported in both public and private sectors that were symptoms of the divergence that often exists between policy and operational ethics in the workplace (2). Fallout from the Enron scandal in 2001 triggered a knee-jerk reaction from governments and corporate leaders to force fit ethics and compliance programs into their organizations (3). Up to now, no evidence of how those initiatives have improved the management of ethical organizational behaviour has been reported. Unsurprisingly, there is dwindling confidence about the resolve of politicians and business leaders to bring about systemic change and few, apparently, are convinced that emphasizing the management of ethical behavior would contribute to greater organizational effectiveness.

Corporate reasoning that separates "essential" business functions from ethics and compliance functions of course influences the priority given to managing ethical behavior. Ethics education in business schools predictably tends to reflect the priorities of the business world. The Ethics Education Task Force of the Association to Advance Collegiate Schools of Business (AACSB) cites faculty apathy as being the "greatest single impediment to increasing the emphasis on ethical education in the business curriculum" (4). Strange as it may appear, business schools have no means of measurement in place to determine whether they are teaching ethics in a way that increases the likelihood of producing future leaders who will be competent to effectively manage ethical behavior (5). The last straw may be that the sharp decline in the percentage of tenured faculty at U.S. universities since 1960 may hamper significant change in that area of education in the near future (6).

A Theory in Plain Sight

Douglas MacGregor wrote that "every managerial act rests on theory" and thus "management in any form is prediction" (7). Yet, those factors strangely seem to be missing up to now in most approaches to managing ethical behavior in organizations. In fact, rational theory and prediction are often replaced by tradition, experience and wishful thinking, sometimes supported by little more than actions as modest as codes of ethics being distributed to employees or posted like slogans on empty wall space. Few corporate leaders in the public and private sectors would disagree with the idea that, when all's said and done, ethical behavior in organizations needs to be exemplified and led by top management, and furthermore that "experience alone, without theory, teaches management nothing about what to do" (8). From a practical standpoint, corporate leaders might exercise stronger leadership and more readily embrace their responsibility in that area of management if they had a sound theory to guide them. On the other hand, those leaders probably would pay more attention to a theory that could help them in that respect if there was evidence that it could also help them lead their enterprises to become profitable and stay in business.

A theory that meets those criteria has in fact been in plain sight for over half a century. It was developed by W. Edwards Deming (1900-1993). His management theory has been used to transform the management of organizations that have become world leaders in the quality of their goods, services, and competitive position (9). Although enterprises that implement Dr. Deming's theory are still a minority in the industrialized world, their reputation is gaining attention because of their *integrity* as well as for their prowess in the market place. Up to now, this attribute has not received as much attention from the wider

business community although, I would argue, how to manage ethical behavior in organizations pervades much of Deming's writing and teaching.

Prominent researchers who have collaborated with him in advocating and implementing his philosophy concur that they "are forced to grapple with his management theory simply because it works" (10). And, among the factors that make it 'work', *three* in particular pertain to managing *ethical* behavior:

Halting management practices that undermine ethical behavior in organizations.

Teaching and spreading ethical values through activities involved in continuous improvement.

Transforming managers' attitudes about respect for individual workers and their capacities.

1. HALTING MANAGEMENT PRACTICES THAT UNDERMINE ETHICAL BEHAVIOR IN ORGANIZATIONS

To appreciate how Dr. Deming's theory of management provides an ethical dynamic to managing organizational behavior we need to make some inferences about his perception of organizational practices in the 20th century. His major concern is the decline of Western management and the obligation of top executives to choose a purpose and behaviors that could bring it to a halt. "Choice of aim", he states, "is clearly a matter of clarification of values" (11). It's also reasonable to infer that he viewed moral reasoning as an aspect of practical reasoning, which deals with questions about how to act (12).

The Nature of the Decline of Western Management

The nature of the decline of management in the West that so preoccupied Dr. Deming is in many respects attributable to the organizational theories of Max Weber and Frederick Taylor. Since the early part of the 20th century elements of their theories and later, others such as that of the economist Milton Friedman, have shaped businesses' priorities, the way organizations are structured and how they function, to an extent that those theories may still be viewed as embedded in the status quo of Western management thinking.

Maximilian Carl Emil Weber (1864-1920) was probably the foremost social theorist of the twentieth century. He originated the scientific study of organizations by examining the relationship between bureaucracy and modernization (13). He proposed a 'bureaucratic' theory of management to ensure that companies and the work they performed were organized as economically as possible. His theory has been adopted, intentionally or unintentionally, by businesses worldwide. Weber saw bureaucracy as the most rational method of business administration. In the 19th century attempts were made to create greater efficiency in organizations and management of work. Weber broke new ground in the early 20th century by developing a more comprehensive theory of organization and management. He observed parallels between mechanization of industry and bureaucratic forms of organization in that "the bureaucratic form routinizes the process of administration exactly as the machine routinizes production. In his work we find the first comprehensive definition of bureaucracy as a form of organization that emphasizes precision, speed, clarity, regularity, reliability, and efficiency achieved through the creation of a fixed division of tasks, hierarchical supervision, and detailed rules and regulation". In fact, Weber viewed bureaucracy as "a power instrument of the first order and believed that where the bureaucratization of power is completely carried through, a form of power relation is established that is practically unshatterable" (14).

Frederick Winslow Taylor (1890-1940) is renowned for his introduction of the economic benefits of detailed specification and measurement of all organizational tasks by experts using time and motion studies. Tasks were standardized as much as possible. Jobs were broken down so that unskilled workers could be trained and made productive within days if not hours. Even complex skills could be broken down into specific actions that, with the proper equipment, could be performed by almost anyone (15). The distinctive feature of his approach "was not the fact that he tried to mechanize the organization of people and work, but the degree to which he was able to do this". The effect of Taylor's scientific management on the workplace has been enormous, increasing productivity exponentially while accelerating the replacement of skilled craftspeople by unskilled workers. But those increases were achieved at great human cost as they more or less reduced many workers to automatons. Nonetheless, his principles of scientific management provided the cornerstone for work design throughout the 20th century and even up to the present day (16).

In conjunction with Milton Friedman's economic doctrine of maximizing value (usually as 'profits' in one form or another) for companies' shareholders, as the driving force and the dominant value behind most business strategies, Taylor's and Weber's theories hugely influenced the collective policies that we call modern management even in the latter part of the 20th century (17). In fact a Wall Street Journal essay written by Peter Drucker in 1986 urged companies in the western world to still use variations of Taylor's

and Weber's theories in which productivity, wealth creation, and improvement are seen as generated by management. Employees, in contrast, are seen mainly as 'units of production' or as ancillary to the 'office' i.e. the organizational post they occupy (18). Singling out those characterizations may be criticized as simplistic and an overemphasis on minor flaws in otherwise progressive organizational theories. The situation, however, is quite the opposite due to the consequences of human problems resulting from such methods of production that have been controversial ever since they were introduced. As a sociologist, Weber was aware of the social consequences of the "proliferation of bureaucracy". He saw that the bureaucratic approach had potential "to routinize and mechanize almost every aspect of human life, eroding the human spirit and capacity for spontaneous action". He also recognized that it could have grave political consequences in undermining the potential for more democratic forms of organization (19).

The ideas of both men have been and still are widely applied in the public and private sectors. Their theories undeniably contributed to great wealth for a few individuals and a controversial livelihood for the masses. Many managers who oversee organizations with assembly lines and other mechanistic or routinized activities still think they work well. In fact, elements of Weber's theory are so pervasive in the industrialized world that managers routinely apply them when structuring their organizations. While ethics is not specifically addressed in either theory, it is usually perceived as part of operating procedures which, it was assumed, would provide a sufficient framework for managing ethical behavior as well as the key to a company's success.

Despite the economic advantages both theories have brought to organizations and their shareholders, it is difficult to ignore their contribution to suppressing significant improvement in the management of people and that they limited the management of ethical behavior in organizations. For example, despite labor and human rights legislation, individuals are still perceived in most economies as Taylor and Weber represented them. Their views degraded organization personnel and ushered in an opportunity for unscrupulous managers to perpetrate egregious unethical practices that were normalized by diminishing the worth of employees as human beings and using collective guilt to hold them responsible for poor company performance. This led to the exploitation and mistreatment of individuals and paradoxically, their underutilization. Even today, corporate leaders with this mind-set tend to set aside evidence which indicates that competitive problems of organizations are not due to workers in the system but are more likely due to managing with a set of ideas that is outmoded, incorrect, inhumane and unethical. Dr. Deming declared that in most business situations 94 percent of the problems are usually problems of the system. Thus it's the system that must be altered in some fundamental way to improve quality of products and services and the quality of ethical behavior. Only management can create the conditions to bring that about (20).

The Need for Transformation

W. Edwards Deming went beyond other organizational theories by expressly advocating the transformation of management, and by that he meant Western *style* management. "For American management", he wrote, "only transformation...can halt the decline of American Industry". Nevertheless, as is now evident, his theory has universal relevance.

In economic theory, two principal elements of production are capital and labor. Economists would agree with Taylor that technology is another important element. That means, given the same capital and labor, a company with superior technology can produce more and better products or services. Deming added another element. As knowledge is the key to quality then, given the same capital, labor and technology, he argued that a company can produce better quality with higher and continually improved productivity than others, if additionally, it possesses the System of Profound Knowledge and the others do not. "The System of Profound Knowledge", he wrote "is a theory for transformation" (21).

Briefly, the System of Profound Knowledge consists of four interrelated components:

Appreciation for a system – Understanding that a system must have an aim as without one there is no system; and that a system is therefore a managed "network of interdependent components that work together to try to accomplish the aim of the system". An example that he cites of an optimized system is a good orchestra. "The players are not there to play as prima donnas, each one trying to catch the ear of the listener. They are there to support each other. Individually they need not be the best players in the country" (22).

Knowledge about variation – Understanding the nature of a stable system, and some understanding of special causes are essential for managing a system, including managing people.

Theory of knowledge – Understanding that knowledge comes from theory. The theory of knowledge helps us to understand that management in any form is prediction. "Any rational plan, however simple, is

prediction concerning conditions, behavior, and performance of people, procedures, equipment, or materials”.

Psychology – Understanding the psychology of individuals, of a group, of society, and the psychology of change (23).

We may infer that Deming’s *central premise* is that Profound Knowledge “is necessary for individual managers in industry, education and government, to transform themselves and their organizations from the present style of Western management to one of optimization”. He is unequivocal that the *first* step “is the transformation of the manager as an individual...The people who are most in need of profound knowledge are the managers”, he wrote, “particularly top managers...A leader must have knowledge. A leader must be able to teach”. The essential factor, he insists, “is for top management to awaken to the challenge and take on leadership for change”.

Transformation vs. Upgrading

In the world of business, as in nature, change is often induced by environmental pressure. Change or go out of business. Some executives see the avenue to change through ‘best intentions,’ particularly with respect to ethics. If you ask some corporate leaders (as did interviewers from the Conference Board of Canada in 2006-7) “Are you in favor of ethical behavior in organizations”, overwhelmingly they would answer “yes” (24). Top executives who value integrity want their organizations to have an ethical culture usually have remedies, and more often than not most of them are flawed. Typically their prescriptions for improvement call for best efforts. Everyone should do their best, make people accountable for their work, reward excellence etc. But Dr. Deming caustically observed that best efforts without guidance from profound knowledge can result in tampering, worsening, even ruining perfectly good systems (25).

In contrast, the transformation he advocates is more like metamorphosis. Familiar examples of this are tadpole to frog, caterpillar to butterfly etc. and they illustrate the abrupt changes which occur with a change of environment. The two larvae and their metamorphoses illustrate how that requirement for change is met. There is a sudden demand for new organs which would have been quite useless in the old environment, and organs which were of use in the old environment but are of no use in the new have to be eliminated. Such situations require the subjects to adapt or become extinct.

Similarly, for Dr. Deming transformation “is not a job of reconstruction, nor is it revision”. Like a metamorphosis, it requires a whole new structure from foundation upward. An organization that wants to transform itself has to change completely, including entrenched beliefs, attitudes and practices. A critical factor for managers, therefore, is learning how to learn how to change and how to overcome the difficulties that this entails (26).

2. TEACHING AND SPREADING ETHICAL VALUES THROUGH ACTIVITIES FOR CONTINUOUS IMPROVEMENT

Dr. Deming regarded the 14 points of his theory as “a natural application of the System of Profound Knowledge”. While they provide a framework for managing an organization, they also provide guidelines for managing ethical behavior. Although the ‘subject of ethics’ is not explicitly addressed, ‘universal values’ are. Like quality, they are built in. They are implicitly and explicitly integrated with the 14 points and conceivably model how they would be taught and spread through all activities and processes. That is to say, values such as responsibility for one’s actions, respect for human beings as unique individuals, loyalty (which also implies collaboration as a value), fairness in our business dealings with each other, compassion for all, and candor, are reflected within and woven together throughout the points (27):

1. Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs (*responsibility, respect*).
2. Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their *responsibilities*, and take on leadership for change.
3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place (*responsibility, respect*).
4. End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move towards a single supplier for any one item, on a long-term relationship of *loyalty* and trust (*candor, respect*).
5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs (*responsibility, fairness, candor*).
6. Institute training on the job (*responsibility, fairness, respect*).

7. Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of an overhaul, as well as supervision of production workers (*responsibility, respect, loyalty, fairness, compassion*).
8. Drive out fear, so that everyone may work effectively for the company (*responsibility, respect, fairness, loyalty, compassion, candor*).
9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service (*responsibility, loyalty, fairness, candor*).
10. Eliminate slogans, exhortations, and targets for the workforce asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force (*responsibility, respect, fairness, candor*).
11. a. Eliminate work standards (quotas) on the factory floor. Substitute leadership (*responsibility, fairness, respect*).
- b. Eliminate management by objective. Eliminate management by numbers and numerical goals. Substitute leadership (*responsibility, respect, fairness, compassion*).
12. a. Remove barriers that rob the hourly paid worker of his right to pride in workmanship. The *responsibility* of supervisors must be changed from sheer numbers to quality (*respect, loyalty, fairness, compassion*).
- b. Remove barriers that rob people in management and engineering of their right to pride in workmanship. This means, inter alia, abolishment of the annual or merit rating and management by objective (*responsibility, respect, loyalty, fairness, compassion*).
13. Institute a vigorous program of education and self-improvement (*responsibility, respect, fairness*).
14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job (*responsibility, respect, loyalty*) (28).

Theory vs. Practice

The importance Dr. Deming attached to ethical awareness may be reflected in his sensitivity to every aspect of organizational life. In that respect, values are not only accentuated by the aim of a company, they are also taught and spread by activities involved in continuous improvement and creating quality outcomes. We may assume that he recognized that, for ethical values to have practical importance, people must see them in action rather than as simply enshrined as moral virtues to be held in high regard. As Lord Hewart once famously insisted “it is not merely of some importance but is of fundamental importance, that justice should not only be done, but should manifestly and undoubtedly be seen to be done” (29).

Wherever they go, managers bring their values along. But the values and attitudes they live by day-to-day are the same ones they use to run their businesses, be they factories, offices or schools. In other words, we must assume they don't have one set of values and attitudes for their organizations and one for all other aspects of life (30). The process of transformation requires executives to discover what values actually control their behavior, decide what values they want to commit themselves to, and learn how actualize them. At the same time they must learn how to make their reasoning and values evident as they formulate and decide on company policies, as they transmit and visibly test the implications of those policies throughout the system, and as they monitor how values are integrated with every activity as operational procedures are implemented.

There is evidence that values become visible in workplace activities when employees and management are encouraged not to cover up their errors. An example of this was reported in an independent study, sponsored by a group of Harvard physicians, on how leader and coworker relationships influence errors in the workplace. The story of how the study unfolded exemplifies the effects of perceiving values such as responsibility, respect, candor and compassion in terms of purposeful behaviors for improving the quality and productivity of service in the hospital units involved.

Amy Edmonston of Harvard University, who led the study, was initially taken aback by the responses to nurse questionnaires that she used to collect data from eight nursing units. The data showed that the units with the best leadership and coworker relationships reported making ten times more errors than the worst. She also discovered the better units reported more errors because people felt psychologically safe to do so. They didn't see reporting of errors as noting sloppy work or incompetence, but rather as a reflection of everyone acknowledging and learning from mistakes. In these units, nurses said things like “mistakes are

natural and normal to document” and “mistakes are serious because of the toxicity of the drugs, so you are never afraid to tell the nurse manager”.

Yet, when performance appraisal time came around for nurses in the units where there was low reporting of errors, management rewarded employees who were quieter and less disruptive. In those units, nurses said things like “The environment is unforgiving, heads will roll”. They defensively adjusted to inadequate materials without complaint, created the impression that they never fail, and found ways to carry out their tasks without questioning flawed practices. They were seen as team players. They got sterling evaluations. Nonetheless, they unwittingly caused the same mistakes to happen over and over again. Their silence, along with their talent to disguise and work around problems was not ethical. It undermined individuals’ integrity and organizational learning – except learning how to cover up error (31).

Jack Welch, a former CEO of General Electric, also addressed that issue when wrote about lack of candor as “the biggest dirty little secret in Business”. He was not talking about “malevolent dishonesty”. What he was talking about, he says, is how” too many people – too often – instinctively don’t express themselves with frankness. They don’t communicate straightforwardly or put forward ideas looking to stimulate real debate... They withhold comments or criticism. They keep their mouths shut in order to make people feel better or to avoid conflict and they sugarcoat bad news in order to maintain appearances”. They avoid candor. He regards this as “a huge problem that is absolutely damaging and that permeates almost every aspect of business” (32).

Corporate leaders should rightly be concerned by the Enron to Madov type cover-ups even if they involve only a small minority of employees who steal and swindle. At the same time, Chris Argyris cautions, it’s important that they focus their attention equally on the troubling, continuous and widespread undermining of ethical behavior that occurs in organizations when a majority of employees fear failure to such a degree, that to avoid embarrassment or threat of job loss they reflexively react with defensive actions that are also covered up. The cover-ups continue for years and are taken for granted for they are regarded as human nature. The result of these countless intensely counterproductive and covered up everyday actions”, he says”, is to “deaden individuals’ awareness to the ethical pollution they are producing” (33).

The Toyota Motor Corporation, which was awarded a Deming Prize in 1965, considers respect, fairness, responsibility, candor, and loyalty (especially collaboration) so important to their business that, reportedly, one of its most revolutionary production techniques is to locate suppliers inside its own factories. The Toyota Way document 2001 also declares “We view errors as opportunities for learning. Rather than blaming individuals, the organization takes corrective actions and distributes knowledge about each experience broadly. Learning is a continuous company-wide process as superiors motivate and train subordinates; as predecessors do the same for successors; and as team members at all levels share knowledge with one another”.

3. TRANSFORMING MANAGERS’ ATTITUDES ABOUT RESPECT FOR INDIVIDUAL WORKERS AND THEIR CAPACITIES

A third factor in Dr. Deming’s philosophy that pertains to managing ethical behavior in organizations is part of expressing respect for people as human beings. That is, recognizing the significance of their individuality. He drew attention to the fact that people are different from one another. “A manager of people must be aware of these differences”, he wrote, “and use them for optimization of everybody’s abilities and inclinations” (34). In 2000 I made a sentimental visit to the high school I attended many years ago. The headmaster at the time of my visit told me that he saw every pupil as important. He said that he made it a point to know every boy in the school throughout their education at that institution. I asked him how he was able to do this. He told me that when he became headmaster he introduced and taught a class that was mandatory for all entry level pupils during their first year. In this way he got to personally know every boy in the school and was able to follow them throughout the course of their educational development.

Dr. Deming viewed organizations as people, and not just buildings, materials and equipment. “If you destroy the people of a company, you do not have much left”. In his view, without people an organization does not exist. His theory therefore is about continuous improvement, not only for products and services, but equally, if not primarily, for improving individual employee well-being. He considered this factor to be so important that he added an additional 14 points about the new role of a manager in managing people

after the transformation (35). From this perspective, ethics is not about abstract virtues of justice and goodness etc. Ethics fundamentally is about respect for people. Ethics programs in organizations often may fail because, as Dr. Deming observed, “management of industry, education and government operate today under the supposition that all people are alike”.

Management by Fear Does Not Support Ethical Behavior

The Taylor/Weber theories of management are essentially about control. Control is usually exercised by negative and positive extrinsic motivation or manipulation. Either way it is likely to induce fear: fear of embarrassment, of punishment or of job loss. Most types of numerical comparison of workers are more visible means of control. Yet if management techniques like management by objectives (MBO), planning, programming, budgeting systems (PPBS), and management information systems (MIS), are eliminated, managers may ask how they can exercise control, keep the workers honest and working at their utmost so that they can compete? Those questions, of course, imply that workers are not trustworthy, are indeed ‘Theory X’ oriented and given the chance will ‘short’ the company (36). They also imply that managers themselves are driven by fear based on mistrust, a fear that all problems are caused by people not doing what they are supposed to. So the strategy is to “fight fear with fear and make workers afraid not to do what they are told”. Yet, Chris Argyris’ observed that when individuals are put on the defensive, they will produce valid information for unimportant issues and invalid information for important ones – like the nurses in the above mentioned Harvard study (37).

Dr. Deming declares that managing by fear harms companies and individuals. In that respect it is unethical as well as unproductive. It makes people afraid of retribution for any nonconforming behavior. It punishes any form of risk taking or spontaneity. People are treated like children or criminals, or even like robots. Most often, the reward systems along with the annual review of people are other harmful means of generating fear that directly and indirectly destroy so many people in corporations, schools and government. More and more research indicates that performance appraisal programs cause organizations to suffer untold losses because people emerge from their reviews shaken and devastated, unable to function properly for months. Rather than risk failure or job loss they become yes-people. Managers who make it to the top are themselves products of this system and will have been indoctrinated in short term thinking by the time they get there. In return they all give the company what is rewarded, that is to say, high production, short term profit, lower costs and ultimately destroy the company and sometimes a whole industry in the process (38).

The Most Important Source of Continuous Improvement

Taylor and Weber viewed productivity, wealth creation, and improvement as coming from management in the form of organizational procedures and machinery which harness the collective extrinsic attributes of employees. Their strategy was to have experts designate appropriate organization structures, technology and machinery. “The principle of separating the planning and design of work from its execution is often seen as the most pernicious and far reaching element of Taylor’s approach to management. It effectively “splits” the worker, advocating the separation of hand and brain”. As Taylor was fond of telling his workers “You are not supposed to think. There are other people paid for thinking around here”. Men were no more than “hands” or “manpower”, the energy or force required to propel the organizational machine (39). These factors rein in the individualism of employees but shape and conjoin their actions so that every part of the organization is more economical. As it turned out, that strategy came with great economic cost, mostly in the form of waste. But the cost is more devastating in human terms. If managers view Taylor’s and Weber’s strategy as the only source of improvement, ironically it increases the probability that it will backfire and destroy a company as a result of wasting its workforce by underutilization and by underestimating intrinsic motivation as the driving force of employee ingenuity. Consequently the enterprise is deprived of the most important source of improvement, namely the knowledge, skills and creativity of its people.

In his wisdom, Dr. Deming did not dismiss Taylor’s and Weber’s theories outright. He recognized the value of their pragmatic components. Factories may need assembly lines; organizations may need rationalized structures etc. On the other hand, he saw the necessity to transform those principles and techniques by turning them around. Rather than employees being controlled by those components, his theory gives them control of important elements. A consequence for ethical behavior is that individuals are more likely to be intrinsically motivated to continuously improve not only what they are doing but also to help improve everything that impinges on what they are doing and what they have done, in order to maintain and reinforce continuous improvement. The effectiveness of Dr. Deming’s theory for managing

ethical behavior is that it doesn't require everyone to walk around trying to be virtuous. Virtue is discovered and learned in the way employees are encouraged and supported to participate and collaborate in seeking 360 degree continuous improvement. When a critical mass of organization personnel is committed to function in this manner, an ethical culture begins to emerge by osmosis. It reinforces ethical values repeatedly and creates an environment that facilitates the assimilation of new hires to the workforce. Participation in acting out ethical values is also more likely to gain cooperation and to diminish the likelihood of individuals using unethical behavior (40). This is consistent with Dr. Deming's view that the individual is the real source of long term wealth generation and is thus far more significant to improvement of organizational processes than experts, machinery or electronic technology. He saw productivity and wealth coming from the efforts of every employee and the cultivation of individuals' minds.

In contrast to Taylor's and Weber's ideas, Dr. Deming's view is that "For any enterprise to improve, the individual has to be alive and well, working and living without fear, loving his work". Management's job is to see that the organization doesn't get in the way. That is to say, it is important that the aim of a system never be defined in terms of a specific activity or method. It must always relate to a better life for everyone (41). It follows that management has to "eliminate barriers" to people experiencing joy and pride in their work and encourage each individual to develop him/her-self. That might sound overly idealistic except that Deming award winners have shown it to be realistic.

While management may not be able to eliminate all fear from the lives of its employees, it can eliminate fear built into practices such as quotas and management by objectives. Managing ethical behavior is built on trust. A difficult lesson for *Taylored* managers to learn is that all individuals have to be treated with respect, dignified as human beings and given the knowledge and skills that let them feel free to make improvements in the workplace. Respect for people in Dr. Deming's philosophy means recognizing their worth and empowering them. From an ethical as well as a productive standpoint he emphasized that enlisting the efforts of willing workers to do things cooperatively and properly the first time comes from tapping into their intrinsic motivation, treating them humanely, giving them the right tools and responsibility, and making them secure so that they can grow and contribute. Rather than judging people and pigeon-holing them, "the aim should be to help people to optimize the system so that everybody will gain". In his view, the purpose of all management is to bring out the best in individuals and allow each one to contribute fully. This is the real and ethical path to continuous improvement not teams of inspectors, not technology.

CONCLUDING REMARKS

At best, organizations will only do what they are designed to do. Good design should anticipate problems that an organization has to face. Taylor and Weber obviously had this in mind when they developed their theories. There is now abundant evidence that their theories would undoubtedly have been more effective had they recognized, as did Dr. Deming, the importance of human beings' uniqueness and ingenuity and had they provided individuals with the opportunity to contribute to the organization's aim. Few approaches to organizational behavior that encourage the management of ethical behavior are as well documented and satisfy evidence based criteria as that provided by more and more organizations and individuals across the world that are winning Deming awards and by the products and services that have gained both customer satisfaction and market share for their providers.

As management shapes the environment in which people can or cannot work interdependently, it is difficult to avoid the conclusion that management of ethical behavior and continuous improvement of organizational systems and their processes are inextricably linked and focused on the same outcomes. "Once the manager understands the System of Profound Knowledge", Dr. Deming wrote, "he will perceive new meaning to his life, to events, to numbers, to interactions between people...He will have a basis for judgment of his own decisions and for the transformation of his organization" (42). Employees of organizations that embrace his philosophy agree and provide evidence that it has helped their enterprises become profitable and to stay in business. They would also agree that Dr. Deming's Management Theory works to manage ethical behavior and has helped their organizations become 'islands of integrity'. Unlike other attempts to manage ethical behavior in organizations, what makes this theory so compelling is that it is not experienced as an exercise in futility. It works. And it works without codes of ethics being posted like slogans on the walls.

It may be naïve to assume that all corporate leaders will be influenced by evidence and that they will change their views even if events refute beliefs they want to cling to. On the other hand, if the presentation of Dr. Deming's philosophy as described in this paper is credible to concerned corporate leaders and

curious business students then, to paraphrase him - *there now is a theory for managing ethical behavior in organizations. No one can ever again claim that there is nothing useful to teach.*

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DEMING AND DEMOCRACY SET

Nicholas C. Georgantzas
Fordham University School of Business
georgantzas@fordham.edu

Abstract

Bell Telephone Laboratories, 16 May 1924: a Walter A. Shewhart memorandum shows the very first sketch of a modern control chart. Shewhart works on and improves his approach until his 1931 book sets the tone for statistical process control (SPC). To tell between chance and assignable causes or variation, he creates a method to distinguish one type of variation from the other. Following Shewhart, Deming refers to «common» and «special» causes of variation. Common causes are inherent in a process. Special causes are rare events that require immediate action. When a political system starts producing defects consistently, for example, it must be taken off line for repair. But eighty to ninety percent of variation is due to common causes, endemic to political processes. The only way to reduce common variation is to redesign the process itself.

On 27 April 1997, in Alexandria, VA, journalist Clare Crawford-Mason links Deming's management philosophy with the work of Rev. Teilhard de Chardin, SJ, (the «Catholic Darwin»), a French Jesuit priest and anthropologist who discovered the Peking man, and other 20th Century thinkers, in the context of a continuing improvement of human consciousness. By describing democracy and showing its value, this article encourages the adoption of democracy in the context of quality research, specifically elucidating the quality management theory underlying Shewhart's and Deming's work. Deming's System of Profound Knowledge, which integrates psychology, statistics, systems and theory of knowledge, begins with building appreciation for a system. But Deming said: "Until you draw a flow diagram, you do not understand your business". In the political process improvement approach, the emphasis is not on better data for political decision-making in societal control, but much more on streamlining the underlying transformation processes, so that the decision-making regarding their control can be greatly simplified.

Heidegger understands the commencement of Western philosophy as a brief period of authentic openness to being, during the time of the pre-Socratics, especially Anaximander, Heraclitus and Parmenides. Then followed, per Heidegger, a long period increasingly dominated by the forgetting of this initial openness. That period commences with Socrates and Plato, leading to a forgetting or abandonment of monism, which occurs in multitudes throughout modernity. And Heidegger, along with his teacher, Edmund Husserl, influenced Maurice Merleau-Ponty. Closely associated with Epicurus, Jean-Paul Sartre and Simone de Beauvoir, Merleau-Ponty's philosophy is a sustained argument for the foundational role that our human perception plays in understanding the world as well as engaging with the world.

Here, by linking Deming to Plato, we argue that Plato's noosphere has been accrete or immanent in the life of the city-state, his dialogue with it always organic and unabated, and most attentive—one might even say—to its democracy evolution, in all its splendor of temporal dimension bundles, both ontic and ontological ones. Hence, the article shows that, although modernity pertains to Deming's large-scale anthropocentrism or humanocentrism, at once is extremely premature and belongs to the prehistory of the classic temporality of the city-state, at least in comparative proportionality terms.

THE ROLE OF AN EXPERT WITNESS FOR ENUMERATIVE STUDIES

Harold S. Haller, PhD
Consultant in Statistical Studies
Harold S Haller & Company
halhaller@aol.com

Abstract

Dr. Deming spent a portion of his career serving as an expert witness on legal cases in which audits were performed using statistical sampling. For the last two years I have been involved in a similar practice. Administrative law judges charged with adjudicating appeals have hired me to opine on the methods used by CMS contractors to audit the records of fee for service physicians in order to ensure compliance with Medicare billing practices. My case reviews of these enumerative studies include the definition of the population or universe, sampling unit, frame, criteria needed to compute an appropriate sample size, operational definitions, computation of confidence intervals, and Bayesian aspects of extrapolating overpayments to physicians. Case studies will be reviewed that point out some of the CMS contractors' mistakes, which resulted decisions in favor of the plaintiffs.

THE ROLE OF PERFORMANCE APPRAISAL

Dr. Charu Hurria
hurriacharu@hotmail.com

Abstract

W. Edwards Deming (A Critical well respected management thinker) described performance appraisals as one of contemporary management's most deadly diseases. In fact, he asserts that the traditional appraisal, 'nourishes short-term performance, destroys long-term planning, builds fear, demolishes teamwork and fosters rivalry and politics' (Shields 2007, p.22)

This paper is an attempt to critically analyse the varsity of Dr Deming's statement in context of contemporary organisations. Role of Performance appraisal is critically analysed from the perspective of an individual employee and the supervisors. Research evidence shows the evolution of the concept of performance management from performance appraisal and questions the need for a performance appraisal system in organisations.

As part of this paper, a model for performance appraisal system is proposed integrating Deming's thoughts and the current requirements of the individual employees and the organisation's needs.

EXAMPLES OF SUCCESSFUL CHANGE THROUGH APPLICATION OF SYSTEMS THINKING AND OTHER ORGANIZATIONAL CHANGES THAT CAN BE

Thomas F. Kelly, PhD
Tkelly7662@aol.com

The purpose of systems thinking is to change organizations (systems) to improve/increase productivity while not increasing and ideally reducing required resources. **Systems thinking can save the American (and international) economy.**

There are five key strategies we need to drive systemic change.

1 We must **restructure** resources to improve the system. Systems thinking can save the American (and international) economy.

2 **Reallocate** existing resources. Before we look to increase resources we must determine if there are existing resources that can be used.

3 **Use technology** for innovation. We must make maximum use of new technology to change/improve the system. Not all changes require new technology but many do. Friedrich Engels made an astute observation: all great advances in human knowledge have followed some technological breakthrough. For example, when the first cave person (notice ladies I don't say cave man) observed that a sharp stone could be used to cut things, a revolution occurred in tool making, hunting, weapons, shelter, etc. The whole world changed. The easiest example to see of technological innovation as the means to expand knowledge would be invention of the printing press. With this the masses not only gained access to knowledge, but it could be preserved, shared and expanded.

Today we are in the midst of a technological revolution that shows no signs of abating. Computers, the Internet, and numerous other innovations are increasing productive capacity while reducing required resources.

4 **Use data** to drive improvement

5 **Deming's systems methods** We must educate our population

6 **"We need more money"** We must abandon the conventional all purpose solution for solving all problems:

MONEY IS NOT THE PROBLEM. IT NEVER WAS THE PROBLEM AND IT'S NOT THE PROBLEM NOW.

This "solution" has become the primary cause of the problem.

Totally lacking in imagination and ingenuity, it is the automatic false solution we hear all the time. It is a common assumption in both public/governmental and private organization.

Some assumptions for leadership and systemic change.

"The great leader confronts the brutal facts." Jim Collins in Good to Great.

"The healthy personality deals with reality." William Glasser in Reality Therapy

Thomas Kelly:

- If you don't deal with reality, reality deals with you.
- Change is constant and inevitable
- Change causes both unemployment due to causing jobs to become obsolete and new employment due to creation of new jobs.

- The only viable choices for dealing with change are to resist it or try to influence it.
- Subsidizing unproductive work penalizes all concerned, reduces competitiveness and harms the economy. Carried far enough, subsidies will destroy the economy.

Subsidizing Unproductive Jobs Causes Long Term Unemployment:
It's The System Stupid.

Confront the brutal facts

Capitalism is the most successful antipoverty program in history. It has produced far more wealth for far more people than all other economic systems combined. American capitalism alone has empowered hundreds of millions of penniless immigrants to rise above poverty. This is an undeniable historical fact. The very real problems we experience in our capitalist economy must be viewed in that context.

Capitalism embraces progress, aka change as the means to forever improve the human condition. Thus we have the unending destruction of outdated forms of once productive work replaced by new forms of more productive work. Subsidies used to maintain unproductive or less productive work trade short term gain for long term pain. Few gain short term while many pain long term (including the few who gained short term.) We need to abandon the practice of subsidizing unproductive work to maintain jobs and instead recognize the need to forever improve/change the system. This requires willingness to trade short term pain for the few for long term gain for many (including the few who pained).

Some systems changes do not create pain, e.g. reducing staff through attrition. Effective and timely planning can also minimize or eliminate the pain of unemployment.

THE MASSIVE CHANGE FROM AN AGRARIAN TO INDUSTRIAL SOCIETY.

My friend commented that the family farm was in trouble. It could not compete with the newer large mechanized farms. He said, "America should subsidize the family farm." When asked why, he said that it was the farmers' way of life. It would be cruel for them to have to give it up.

I responded that a hundred years ago we had tens of thousands of blacksmiths in the United States. Should we have subsidized them? If we had, we could still have tens of thousands of blacksmiths today.

He did not reply.

Would it have been kind to subsidize blacksmiths to maintain them in their useless work? That would in fact be cruel. All people want to be useful, to contribute to the welfare of others, to experience the great dignity of honest useful work. Subsidizing the blacksmiths would in fact not only have been cruel to them, but also to productive workers who would have been forced to pay for the blacksmith's unproductive work (i.e. subsidize).

At the turn of the twentieth century over 90% of Americans worked on farms. At the turn of the twenty-first century there were less than 3%. Meanwhile agricultural productivity increased exponentially as innovative forms of automation and new technologies were applied to farming. American agriculture is a clear example of systemic change that dramatically reduced resources while tremendously increasing and improving productivity. In fact, America has provided food for countless populations in foreign countries that could not provide it for themselves.

Every time we subsidize unproductive work we hurt both the unproductive worker and the larger population. Less people producing means less useful goods and services, less income, less tax receipts, and general economic decline. In our efforts to avoid short term pain we cause much greater long term pain for all of society.

THERE IS SUCH A THING AS A USEFUL OR PRODUCTIVE SUBSIDY.

Effective change frequently creates unemployment and new employment. Old products and services are constantly being replaced with new and better ones. Change is. It is constant and inevitable. Given this reality, we are faced with a constant need to deal with unemployment. The overwhelming percentage of unemployment caused by change is the result of changes beyond the control of those unemployed.

The rational solution to constant and ever accelerating change is to retrain people for redeployment to new work. It is in society's interest to set up a system to subsidize this retraining. In some cases it will be necessary to subsidize provision of basic needs for those who need it while being retrained. This type of subsidy actually costs nothing. In fact, it produces greater employment, productivity, wealth and tax revenue.

If we subsidize the building of capacity to produce, that is not only a useful subsidy but one that costs nothing. Money spent on increasing capacity of people to contribute constructive work will bring an exponential positive long term return not only to them but to the general welfare.

**WE HAVE EXAMPLES OF ORGANIZATIONS MAKING SUCCESSFUL SYSTEMIC CHANGES.
WE NEED TO LEARN FROM SUCCESS.**

1 Toll taking, traffic congestion and pollution
(Government building system capacity)

- Exact change lanes - technology
- Double the tolls on bridges and tunnels and collect one way -structure
- Easy Pass - technology
- Express Easy Pass - technology
- Imitation of above systemic improvements across the entire country - generalization
- Better production, saves gas, time, lowers costs and requires fewer resources

2 NYS Department of Motor Vehicles long lines and inconvenience
(Government building system capacity)

- Extend time for registration renewal from one year to 2 - structure
- Extend time for license renewal from 1 year to 5 or longer.- structure
- Make license and registration renewal available on line or mail - technology
- Make all DMV forms available on line - technology

3 The G I Bill
(Government building system capacity)

- Subsidized college and other forms of education for millions
- Produced millions of college graduates and other more highly educated citizens
- Enabled millions to contribute more productive work
- Enabled millions to improve their incomes and life style.
- Increased tax revenues resulting from increased incomes and productive work
- Cost nothing. Economic return to the nation has been exponential.
- Also enabled generations of offspring to do all of the above

4 The Interstate Highway System
(Government building system capacity)

- Subsidy increased productive capacity while costing nothing after bringing a tremendous economic return by increasing wealth, income and tax revenue.
- Increased mobility of population for employment alternatives
- Cost nothing. Paid for itself many times over.

- 5 IRS filing electronic tax returns
(Government building system capacity)

Paper return costs \$15. Electronic return costs 86 cents with prompt refunds.

- 6 Use of rollers in place of brushes for painting (example of simple technology).
(Private sector building capacity)

Cut cost and increased productivity, speeded work completion. This allowed the painting of 4 or 5 rooms in the time previously needed for one. It also reduced the labor needed to bend and reach and use ladders by attaching rollers to poles.

- 7 Airlines electronic ticketing
(Private sector building capacity)
Saves time, money, labor, travel to purchase, and reduces inconvenience.

WE ALSO HAVE EXAMPLES OF ORGANIZATIONS THAT HAVE NOT MADE SUCCESSFUL
SYSTEMIC CHANGES. SOME PROPOSED SYSTEMS CHANGES

In all cases, the changes described will result in better production for less cost.

Post Office

- Handled 40 billion less pieces of mail in 2008
- Now faces competition from email, Federal Express and others
- 2009 Raised stamp price for third year in a row
- Declared a \$7 billion budget deficit in 2009 – needs a bailout
- Suggests cutting delivery from 6 days to 5 – estimates \$3 billion saving

Systemic solutions:

- 1 Cut delivery from 6 days to 3 and give each carrier 2 routes. This will eliminate virtually half of the carriers and the need for \$7 billion subsidy for 2009 and all future subsidies.
- 2 Use technology to filter out junk mail for any customers that choose. This will cut pieces of mail handled by many billions more while improving service.
- 3 With additional reduction from elimination of junk mail further reduce delivery to 2 days per week and give each carrier three routes.

Prison overcrowding

California is the latest to proclaim the necessity to release felons due to overcrowding. The governor has estimated the need to release 45,000 felons. This is a national problem that has been going on for decades. Prison construction is extremely expensive.

Systemic solution: reallocation of resources

- 1 Use vacant military bases as prisons as was done in WW II for prisoners of war. These facilities were good enough for our citizen soldiers and will do for felons. (Reallocation and modification of existing resources)
- 2 While some updating of these facilities may be necessary, it is far cheaper than new prisons.
- 3 Crime and its high economic costs will be dramatically reduced far in excess of any costs for renovations thereby making this a no cost process.
- 4 Employment and local economies in the areas of these vacated bases/prisons will improve while they provide this most valuable service.

Uninsured motorists

Estimates of numbers of uninsured motorists are as high as 30% in some states. The cost is born by others.

Systemic Solution (appeared in USA Today)

- 1 Adopt a national no fault automobile insurance plan

- 2 Calculate the cost of insurance nationally under such a plan
- 3 Add the price of insurance to the price of gasoline at the pump.
- 4 Reduce uninsured motorists to zero
- 5 Pay according to use
- 6 Encourage gas conservation
- 7 Cut pollution

Public Education

The structure of public education is basically unchanged after 150 years.

The cost of public education has increased much faster than income levels of tax payers. Public education is doing its own version of General Motors – pricing itself out of existence. The declining economy is accelerating this process. We face massive teacher layoffs and the ultimate destruction of the public school system. As the ability of our taxpayers to afford public education diminishes they will turn to alternatives out of necessity.

Systemic Solution

- 1 Move to the private school form of governance which has functioned well for over 100 years (public schools remain public). Set up school building based board of education for each school.
- 2 Move decision making closer to point of implementation and impact. Recognize educators are professionals.
- 3 Make the school principle CEO. Eliminate central administration governance and services.
- 4 The need for any centralized services can be contracted out as businesses do, instead of duplicating them in each school district.

Probable results of restructuring public school governance to the building level include:

1. Save many teacher jobs long term in the present economic climate. The biggest item by far in any education budget is personnel.
2. Very big annual savings - we probably spend from 10 to 30 percent of education budgets on central administration depending on the size of the system.
3. Greater accountability - the smaller the organization, the greater its transparency.
4. Place authority for results in the local board and Principal (who are now accountable but do not have proportionate authority for decision making in their schools).
5. Probably much better student achievement results. The present bureaucratic structure has most decisions affecting students made by people who are distant from them.
6. Cut bureaucracy and red tape. Bureaucracies tend to become their own reason to exist. Their primary goal becomes preservation and extension of the bureaucracy. Those closest to the job tend to know best what is needed to improve production. In the case of education schools are closest to the children and most aware of student needs.
7. Far less opportunity for misuse and theft of funds. The larger the organization the greater the chances of distant bureaucrats making decisions about resource allocations that are less positive in their impact on students. .
8. Use technology to improve student achievement while increasing class size and cutting costs. The power of technology to hold student attention makes it possible to deal far more effectively with individual student differences and needs thereby increasing student achievement while increasing class size.
9. Use technology to individualize instruction and deal with individual student differences also enables effective inclusion of most special education, remedial, learning disabled and gifted students. This will reduce billions nationally in current costs of these “special programs”.
10. Probably lots of other benefits if we think about it.

This transition should be voluntary. Voters in each school district could decide if and when they want it.

Higher Education

The structure of public education is basically unchanged after 1000 years

Higher education is also pricing itself out of existence. Costs rapidly moving beyond the reach of our population will cause creation and adoption of more cost effective alternatives.

Systemic Solutions

1. Expand the community college system (existing resources) to provide for as many students as want to attend them. Because these are usually county based they can be attended while living at home and do not require dormitories or many other faculties of traditional four year colleges.
2. Convert community colleges to full four year colleges for as many students as want to attend them. These can expand service through online education and adjunct professors to reduce costs.
3. Use technology to offer as many programs as possible. This reduces the need for expensive facilities required for regular classroom instruction. It also eliminates costly and time consuming travel. It makes access far greater than programs in a traditional setting. Many colleges are now offering state certified whole degrees on line.
4. Separate “professional schools” (education, business, medical, law, other) from other higher education programs/institutions. These programs inflate the cost of professional programs so the income they produce can be used as a “cash cow” to subsidize other academic programs that do not bring in sufficient enrollment to support themselves. This unfairly increases the cost of the professional programs.
5. Use adjuncts in professional programs who have real world experience as well as academic credentials in the professions that they teach. Adjuncts from the professions can be (and usually are) every bit as competent as full time college professors. Adjuncts cost a tiny fraction of full time professors. Frequently they are much more in contact with the current world of work.
6. Move to electronic textbooks for major savings.
7. Offer full time professors the option of increased teaching load in lieu of publishing and research. Use evaluation of their teaching effectiveness for tenure and promotion.

Dependence on foreign oil/energy

There is a way to get off foreign oil. We have effectively banned any new exploration or refinery building in America for over 35 years. Tens of trillions of dollars have been sent overseas during that time. We know that we have massive domestic resources of oil and gas within our control. No less oil has been consumed in America or world-wide because of this blockage of use of our own resources nor will it be until we come up with viable alternatives.

The economic impact of the current political policy that blocks domestic drilling, exploration and increased refining dwarfs the effects of the subprime mortgage losses. We spent \$700 billion in 2008 alone on foreign oil. If we do that for the next ten years we will send \$7 Trillion out of America.

Systemic Solutions

- 1 Explore, find and use our own plentiful resources of oil, gas and nuclear energy and build as many refineries as necessary:
- 2 Many high paying jobs overseas that we now subsidize will return to America.
- 3 Eliminate our negative balance of payments and create a positive one.
- 4 The price of energy (gas, gasoline and home heating oil) will drop significantly.
- 5 Have a tremendous positive effect on the American economy.
- 6 Dramatically increase the number of high paying domestic jobs.
- 7 Reduce the income and influence of hostile countries who currently supply energy to us.
- 8 Reduce ability of hostile oil producing countries to fund and sponsor terrorists.
- 9 Eliminate our military need to protect foreign energy sources. Less foreign entanglements.
- 10 Keep looking for green alternatives until we find/develop them.

Health Care/Medicare

Health care costs are on track to bankrupt the entire country

Systemic Solutions

- 1 Electronic medical records can cut the cost of record keeping while making records available more efficiently for patients and doctors. For our highly mobile population this can save lives. Make the process voluntary. Once people understand the advantages the overwhelming percentage will do it willingly.
- 2 Medical savings accounts as a choice.
- 3 Tort Reform
- 4 Interstate sales for all health insurance companies to increase competition and choice
- 5 Stop AMA lobby blocking an increase in the number of medical school entrants to increase the number of doctors.
- 6 Allow doctors and nurses to have loans for their education that can be repaid by service in clinics set up in poor areas.
- 7 Subsidize free or low cost clinics in poor areas (much cheaper than current schemes)
- 8 Recruit retired volunteer doctors to work part time in hospital emergency rooms
- 9 Develop and implement public school health curriculum extensively beyond one semester K-12. Investment in prevention of health problems will cost nothing with the subsequent decrease in health problems (to say nothing of the decrease in human sickness and suffering avoided). Prevention is an education issue.
- 10 Other?

Social Security

Social security is scheduled to go broke in the near future. In 1935 American life expectancy was 65. In 2009 it is 77 – 78. It is projected to continue to increase with medical advances. Great increases in life expectancy are in all probability in the works.

Systemic Solutions

- 1 Raise the retirement age, increasing with life expectancy. Shift this to a point where funding and life expectancy are in balance as presently done by life insurance companies.
- 2 Encourage extension of full time employment for older workers with tax breaks for businesses.
- 3 Encourage employers to offer part time employment as an alternative to retirement with.

Government Reform

California is bankrupt. NY is close to bankruptcy. At least a dozen states are probably also close to bankruptcy. The federal deficit has quadrupled in 9 months. Etc., etc, etc.

Systemic Solutions

1. Term limits for all politicians including judges.
2. Term limits for all bureaucrats who work for politicians and de facto make most of the decisions/regulations that affect us.

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Dr. Thomas Kelly is Associate Professor of Administration, Leadership and Technology at Dowling College in Oakdale, New York. kellyth@dowling.edu or tkelly7662@aol.com

ADD HEALTH CARE ALTERNATIVE

Examples of random or negatively directed change = danger

General motors
Post Office
Public schools
Higher Education

Planned change = opportunity

Recognize change is constant and inevitable
Commit to permanent organizational self assessment and self improvement
Minimize unemployment in numbers and duration
Maximize employment
Maximize economic prosperity

MANAGE KNOWLEDGE WORKERS FOR LEAN PROCESS QUALITY

W.J. Latzko, PhD
Latzko Associates
latzko@att.net

This paper deals with how one can measure the quality of knowledge workers (clerks, doctors, managers, etc.). Errors made in knowledge work are wasteful (anti-lean) and, often, very costly. This paper shows how to determine when the errors of knowledge workers are beyond what one expects from the system, the system capability. And it shows what to do about such a situation.

To understand the system we first examine the nature of processes, then look at the difference between manufacturing and knowledge work, and detail the method showing some examples in global and government applications.

What is a process?

Since the process is at the heart of managing any system, we examine the basic concepts. Like the human system, simple processes are composed of components. One may combine simple processes to form complex or chain processes.

Simple processes

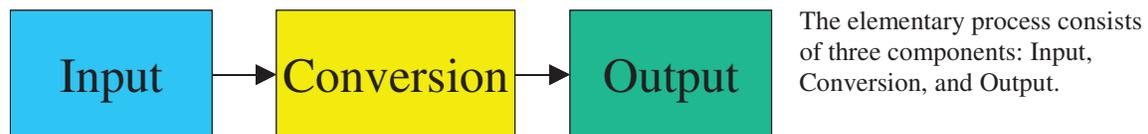


Figure 1. A Simple Process

The elementary process consists of three components: Input, Conversion, and Output.

Input is that which the process receives to execute the

conversion. It has five components in its own right. These are (1) material, (2) machine or equipment, (3) method, (4) environment, and (5), people.

The **material** is that which is received from a supplier. The supplier can be an outside source or it can be the department preceding the one under consideration. The material may be a physical item such as a steel bar or it may be non-tangible such as a piece of information from a data base.

Machine or equipment refers to the tools used to process the material to transform it into the output. These tools can be as sophisticated as computers or computer driven machinery and as simple as a telephone, pen or form.

The **method** is the manner in which the material is processed to convert it into output. Management often outlines the methods in the form of blueprints, formularies, or procedures. At other times management assumes that workers have a basic skill set which they will apply to convert the material into output. Because this assumption is not always true, the ISO 9000 procedure requires the implementation of training in operations and that workers qualify to perform the task.

The **environment** is twofold: (1) physical and (2) managerial. The *physical* environment deals with issues of space, cleanliness of surroundings, temperature, and other similar factors that can have an impact on the performance of the worker and the output. The *managerial* environment deals with the worker management interaction. Management can be far more effective if they understand Deming's (1992) fourteen points and their application than if they do not understand these issues.

Last and actually least influential is the input of **people**. As Heero Hacquebord (2008) points out in a recent article there is a strong interaction between the worker and the system. This means that while it is the worker that delivers mistakes, most of these are only possible because the system was not fail safe. Deming maintained that 96 or more percent of all problems arise from the system, not the people in the system.

The act of **conversion** is the interaction of the people with the other components of the input to change the material into the output. The conversion into the output can be no better than the input.

The **output** is the result of the input and the conversion thereof. It is the output that we measure to determine that the process gives us the desired result.

Complex or chain processes

Most processes are not simple. They are a series of simple processes arranged in a network or chain to create the desired result. The output of the preceding process or processes becomes the input to the

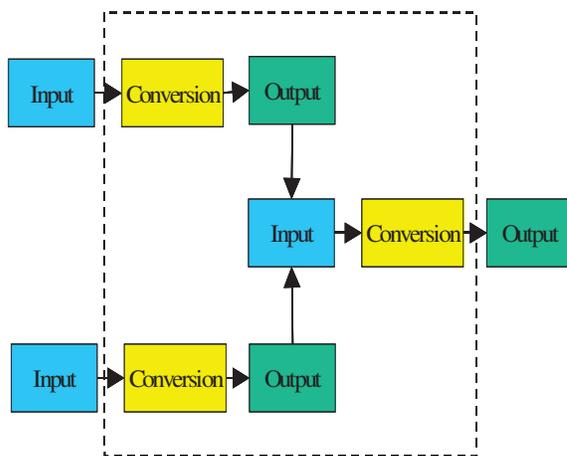


Figure 2. The Supply Chain

following process. Sometimes several simple processes operate concurrently to combine their outputs into the input of the next process. Figure 2 shows the network of simple processes with a dashed line superimposed. The dashed line represents the boundaries of the organization. What takes place within those boundaries is internal while the functions outside the dashed boundaries are external. From this diagram one can see that there are two external suppliers and two internal suppliers. One can also see that the internal input comes from the internal output. Thus one can see that there is an internal customer. The output on the outside of the dashed boundary shows that there is an external customer as well whose needs must also be satisfied.

One needs to be conscious of what takes place within the boundary to satisfy the needs of the

external customer. It is also important to recognize that this satisfaction of needs starts with the ability of the suppliers to furnish the requisite inputs. In the past decade this simple truth has dawned on people and they call it supply chain management. It is the opinion of the writer that a better term for the more complex processes is network management.

An example of a complex network is that of a customer in the United States who calls an organization for help (Input). A switch (conversion) which redirects the call to an off-shore call center (output) receives the call. The off-shore call center employee (input) responds to the call but needs to redirect (conversion) the customer to another specialist (output). The other specialist receives the customer's inquiry (input) process the issue (conversion), and solves the problem (output). We can measure the result at each stage to see if the output was ok or not.

Complex processes can be broken down into simple processes for the purpose of assuring that the output meets the needs of the customer. The customer can be internal to the organization or external.

Dr. Deming attributed to Mr. William Scherkenbach the concept that going upstream to the initial process in a chain "provides powerful leverage toward improvement of a mixture" (Deming, 1992, p. 355). This clearly makes sense since bad quality in the beginning process results in the cost to correct it at some later stage or with the customer.

Knowledge worker quality versus manufactured quality

Shewhart's (1931) original work applied the control chart to manufactured products. Within a decade, Deming and Geoffrey (1941) used Shewhart's method to control clerical quality at the Census Bureau. Others such as Rosander also used Shewhart's methods to control clerical processes. Deming and the others that applied Shewhart's methods to clerical quality realized that if one considered the differences between manufactured processes and knowledge worker processes, the techniques are applicable to all processes. There are three characteristics involved: (1) Method or specification for doing the work, (2) how non-conformances are measured, and (3) the state of control.

Procedure vs. drawing

A key difference between factory and administrative work is how one defines the method of conversion or, how one produces the output.

Manufacturing uses blueprints or formulas to produce the output. Blueprints or formulas have to be current in order to use them. In manufacturing one normally turns out a material, tangible product. Whether it is some gadget, a book, a 50 gallon drum of a chemical compound, the essence is that the output has dimension and mass.

Knowledge workers use procedures. The reason is that the output of service operation is much less tangible: one makes decisions, or processes documents, or holds interviews, or cures a patient, or collects data for research, etc. The output of such activities usually does not have dimension or mass. It is intangible. Procedures delineate the method used for conversion. However, procedures are often not current. This is frequently the case due to the Funnel Effect Rule 4 (See Latzko & Saunders, 1995, p 154). As an old employee passes on knowledge to a new employee some details are misunderstood and become a new way of operating. Incremental changes take place in the operation which we often do not record. The operational definition of conformance seems to be easier to apply to physical operations than to the operations of knowledge workers. As we will show, an operational definition of conformance is requisite to get the best out of the work of knowledge workers.

Type of measure

The fact that one measures most issues of conformance differently for factory and administrative work requires different methods of process control. Because most manufacturing applications have a tangible output, they use interval or ratio measures. These are measures in the CGS (gram-centimeter-second) system of metrics or their English equivalents.

In the case of knowledge workers one can only classify the outcomes as correct or not. The patient is cured or not cured. The data entry is correct or not correct. Clearly in these cases, the system controls the outcome as much if not more than the operator. The system of some patients makes it impossible to cure them. The data entry may have correctly recorded erroneous input. The fault is usually not with the worker but with the system.

Nature of non-conformance

A non-conformance is a deviation from the desired outcome. When non-conformances occur in manufacturing, they often approach the limiting value gradually. For example, tool wear changes the dimensions of the part produced. Gradually the dimensions approach a tolerance limit. When the operator reaches that limit, the operator sharpens or replaces the tool. The process is once more in control. The nature of non-conformance for knowledge workers is more erratic than tool wear. The worker may suddenly produce a non-conformance on one piece of work and do the next one correctly. Since the errors can occur more randomly one needs to take a larger sample over time of the work to measure the average non-conformance.

One should note that the worker in manufacturing controls a piece of equipment which, once properly set up, is the major source of variation. In the process involving a knowledge worker, that worker is the deliverer of the non-conformance. The knowledge worker is an integral part of the system. In manufacturing one takes a measure of the output of a piece of equipment, in knowledge work one measures the output of a person.

Method

Since knowledge workers deliver the non-conformances, and since this constitutes the contribution of each worker and of the process, it becomes important to determine the Process Capability (P_c) so that one can then use the P_c to see if any worker is contributing more than a fair share of the non-conformances. We use the Shewhart Control Chart concept to determine the Process Average and identify any operator that falls outside the three sigma limits as a special cause operator.

The Process Capability (P_c) is that level of quality which normal (common cause) operators can achieve. Operators have occurrences of non-conformance from time to time. If the amount of these non-conformances falls within the upper and lower three sigma limits, we accept that this volume of variation is from common causes of variation. Common causes are not under the control of the operator.

If the common causes are of an unacceptable volume, management must change the process. The operators do not control the process. Exhortations and other motivational measures have no influence at best and may

be harmful. When operators who function within a common cause system change the way they work, they can only become special cause operators, a process called tampering.

There is a great reliance on 100% inspection of the output of knowledge workers. It has been shown that 100% inspection is usually not 100% effective (Latzko & Saunders, 1995, p.49). To get an overview of the departmental quality, the normal method is to sample the departmental output. This measure gives a valuable number, the Process Average (P_a). The P_a is the estimate of the error escape rate. However, the departmental Process Average is the result of a mixture of all the knowledge workers' output. If one or more of the knowledge workers is operating at a level beyond the three sigma limit of the Process Capability (a special cause operator) the incremental amount of errors inflate the Process Average.

If we can identify the special cause operators, determine, and cure the reason for their errors, then the Process Average becomes the Process Capability. Under such circumstances we have brought the process to where it should be and where substantive changes can now improve the system.

This method requires that we identify the Process Average, determine if any special cause operators exist and find the Process Capability of the process. The following paragraphs show how to accomplish such an objective.

1.1. Finding the special cause operator

If the work is correct the supervisor records this fact. If an error exists the supervisor records this as well as attempting to learn how it came about. There are three principal reasons for error: 1) Misunderstanding the job, 2) systems problem, or 3) operator failure.

The reason for a misunderstanding of the job is a lack of training. When this occurs, the supervisor notes the fact and shows the operator the correct procedure. Such training is far more effective than the general training given operators. It is specific, individual, and real time. One should note that often this misunderstanding exists due to the effect of the Funnel Rule 4 mentioned above. Frequently the incumbents train the operators who replace them. Much misunderstanding takes place in such training.

If the problem is due to the system in which the operator works, (e.g. wrong information, bad input, computer problems, static, etc.), the supervisor initiates a fix of the problem. In some circumstances, the supervisor may be able to work around the problem.

Operator failure requires a lot more information than a single incident of non-conformance. One needs to know if this is an isolated instance or if it is the work of a special cause operator. To make this determination, one needs to look at the record of performance of the operator over time. This requires record keeping.

In making the patrol inspection, the supervisor records both good and bad results on a separate form for each employee. In the case of the bad result, the supervisor notes the reason for the problem. The supervisor uses this form to help a special cause operator achieve improvement in performance. The form also becomes the input for the computation of the Process Average, the Process Capability, and identification of special cause operators. What is the job of a supervisor of knowledge workers? Like any managerial position it is to get the work done with maximum efficiency and minimum waste. As Dr. Martin (2007) states, "Lean processes are associated with removing waste from any process. Lean processes distinguish between value-added and non-value-added activities." Clearly, errors and rework are non-value-added activities.

Supervisors either learn from experience and/or formal training know how to remove non-value-added activities related to the flow of work, but many do not know how to handle issues of non-conformance. Mostly they blame the operators and use some form of "remedy" based on the Skinner's concept of behaviorism.

To determine that the quality of the output which leaves their department is free of *muda*, a Japanese term for "waste", most supervisors, as mentioned above, rely on 100% inspection of the finished product. Therefore, they rarely inspect the work for which they are responsible. Supervisors seldom have firsthand knowledge of the quality performance of their staff. As a result, rework caught by the operator and corrected on the spot (waste) goes on unchecked. Further, operators committing systemic errors (thinking that they are acting correctly) will continue to commit such errors unless trained. More waste. Third party inspection of the work does not correct these non-value-added activities. It requires the supervisor's intervention.

When asked what portion of the supervisor's work should be devoted to seeing that the quality of their department meets the customers' needs, senior management often replies about 20%. This figure depends on the critical nature of the output. However, many senior managers often mention this percentage.

How should managers and supervisors spend their time to accomplish the quality needs of their department? Peters and Waterman (2004) noted the benefits of Management by Wandering Around (MBWA). We recommend that managers and supervisors use a specific method of MBWA designed to help them improve the quality of the knowledge workers' output.

The supervisor shall take the allotted time required for working on quality issues (say 20%) and use this time to go to each operator to examine the last piece of work performed. The reason for looking at the most recently completed work is that if an error occurred, there is a much better chance of determining why the error occurred. Usually workers process so many items that the decisions taken on any single transaction quickly disappear from their memory.

1.2. Computation

The paper, "Stabilized t-charts: Theory and Practice" (Latzko, 1969) describes the basis for the computation. This paper deals with the concept that p-charts with varying sample size (n) have varying control limits making them hard to interpret.

One can measure any given observation (fraction non-conforming) on the control chart in terms of how many (t) standard deviations this point is away from the process mean or average. The formula is $t = (p - \bar{p}) / \sigma_p$. If one plots the values of t then the pattern of points remains the same as in the original chart. The upper control limit for such a plot is +3 and the lower control limit is -3. One identifies special cause operators as those falling on or outside such limits.

No single convenience sample gives reliable data on which to judge a person's performance. It is therefore necessary to accumulate many such observations to get a good reading. Since the standard deviation of the Process Average is a function of the Process Average **and** the sample size, one needs to be careful not to jump to conclusions if the sample size is very small. A rule of thumb for the number of cumulative observations to use is $n = t^2(1 - \bar{p}) / \bar{p}$. This amount guarantees that the lower limit of a p-chart for the process will not be an arbitrary value of zero for a distance of $-t$ standard deviations. Thus if the Process Average is 2% and we want to measure actual limits of -1 standard deviation or more, one needs at least 49 sample observations ($n = 1^2(1 - 0.02) / 0.02 = 49$).

The "Stabilized t-Chart" paper provides two ways of finding special cause operators. One uses a specialty Binomial Probability or double square root Paper (BIPP) as described by Mosteller and Tukey (1949) if one deals with just a few operators. However, the BIPP is no longer easily available or necessary with today's personal computers. One can apply the formulas above using Microsoft Excel. Organizations that make much use of this method can create programs for automatic updating and report generation.

1.3. Remediation of special causes

A report lists for each operator of an activity the cumulative non-conformance, the sample size, the fraction non-conforming, and an indication if the operator is a special cause operator. The report also provides a total for all operators in the activity. In addition, the report shows the Process Average and Process Capability. (*Illustrations here*)

If the report signals that an operator is a special cause, the supervisor needs to check that the data input was correct. If it is correct, the supervisor needs to check that the operator had the same work content as others in the activity. Sometimes one gives the best operators the most difficult tasks which can have a much higher chance of error.

If the data is correct and the operator's activity essentially the same as everyone else, the supervisor tries to determine the root cause of the apparent problem. In doing so, the supervisor must be sensitive to possibility of a physical impediment. For example, does the operator need eyeglasses or a new prescription? Is the operator's job location different and could this impact the performance? The supervisor needs to review all aspects of the job to try and determine the cause of the errors. Usually, the identification of a cause leads to a solution.

1.4. Results

This section describes the results obtained in a department in a bank. It shows the control chart using a before and after image detailing the process and the outcome of using the method.

2. Examples

Several examples are presented from the author's experience.

2.1. International

In this section we will present a description of activity of application in a *Mequilladora where they sorted Coupons*. *Two of the operators identified as special cause operators had stations under a loud speaker playing a stream of very loud music. Once the management moved the stations, these operators were as good as the other 38.*

We also present an application of a data entry operation in India. For these applications we show the method and results obtained. This example indicates the issue of recalling former good operators to help their former department with a unusual increase in work. We present a solution that management successfully applied.

Government agency

Here we will describe the activity of a city government agency where interviewer performance was the topic of interest. We show the data analysis and give the impressive results of applying the method.

Summary

The method outlined above is very applicable to finding operators or other knowledge workers contributing more than a fair share of mistakes to a process. It also defines the capability of the process. Once management knows the Process Capability, they can judge if that capability is satisfactory or if process modification is required to get to a more desirable capability. Where applied, this method has met with great success

Conclusion

Since there are differences in the way manufacturing and knowledge worker processes operate, one needs a different approach to assure that knowledge workers produce no waste. The approach presented here shows how one can identify knowledge workers who produce the waste and how to manage them for better quality.

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MAKING A STRATEGIC CHOICE TO WIN BY BUILDING QUALITY IN DESIGN AND STATISTICAL TOOLS ACROSS PRODUCT DESIGN, MANUFACTURING DESIGN AND BUSINESS PROCESS DESIGN IN ERP IMPLEMENTATIONS

Kedar Mahadeshwar
SAP Project Manager
IBM Global Services
mahades@us.ibm.com

Abstract

We have seen many companies using quality by design philosophy to improve its product design and manufacturing process design in many industries including pharmaceuticals. We have also seen companies optimizing its business processes and implementing ERP systems like SAP for all business functions including planning, pricing, procurement, warehousing, billing, transportation etc. But are we getting the strategic benefit out of all this unless we try to link all these efforts end to end?

Companies need to build swat global teams across product design, manufacturing engineers, planners, pricing experts, advertising specialists and have them work together on effective delivery of products to a selected group of customers in the target market.

What matters to a company's ultimate success is driven primarily by strategic choices it makes. The ability to make such choice is dependent on access to key intelligent information the leadership team has and team's capability to make use of that information.

A MODEL TO SECURE IMPROVEMENT PROCESSES BY INTEGRATING ORGANIZATIONAL CULTURE:

A Case Study

Yen Man
Växjö, Sweden
Ymari05@student.vxu.se

Abstract

All companies strive for incremental success and improvements on nowadays demanding markets. Studies have shown that dealing with soft quality factors have proven to be essential for success, such as TQM. This paper suggests a model, which is an attempt to cover the softer elements when working with improvements in order to secure improvement processes.

THINKING ABOUT MANAGEMENT FROM A CLIMATE CHANGE PERSPECTIVE

Andrew J. McKeon

Principal

CarbonRational

amckeon@carbonrational.com

In its Fall, 2009 issue, the MIT Sloan Management Review reported on a wide-ranging study in which 1500 business leaders were surveyed to ascertain their views on the new skills managers will need to address sustainability in the coming years. Results of interviews with experts in the field indicated that there were five management responsibilities that needed improvement: (1) the ability to act on a system-wide basis; (2) collaboration across conventional internal and external boundaries; (3) a business culture that rewards and encourages long-term thinking; (4) new capabilities in activity measurement, process redesign, financial modeling/reporting; and (5) new skills for engaging and communicating with external stakeholders. The survey results indicated that what is lacking in many sustainability initiatives is an overall plan. Efforts are often defensive and tactical rather than strategic; multiple initiatives are disconnected with one focusing on products, another on facilities, and perhaps others addressing employees, customers, or the general public. And sustainability initiatives as a whole reflect incremental rather than transformational change.

W. Edwards Deming spoke about transformational change. And even though he rarely used the term sustainability, Deming would have recognized his ideas reflected in each of the five areas that the Sloan Review cited: Deming taught (1) an appreciation for a system, (2) the importance of cooperation and collaboration as well as competition, (3) the need for managing for the long-term to foster a robust and durable enterprise, (4) new ways of looking at and understanding data and variation and the implications this has for management, and (5) an understanding of business in the broader context of community and society. The kinds of management approaches that sustainability experts today see as critical were being discussed – indeed urged – by Deming decades ago.

In 1980, American business discovered W. Edwards Deming and his work with Japanese industry. Although he was honored in Japan for his contribution to quality and the Japanese Economic Miracle and his American clients saw his potential here as raising the quality of U.S. products and services, his ideas went far beyond what was typically seen as the quality arena. Many of those deeper ideas about economic, physical and social well being got lost in the dust of the Total Quality Management (TQM) fad and other myopic readings of his work. Deming had much to say about survival and prosperity and the thinking and methods needed to sustain business enterprise and our economic well being.

In his last book, *The New Economics*, Deming outlined a way of seeing or lens for looking at work and at life. He called this lens The System of Profound Knowledge. It was to enable improvement of quality of management, quality of life, and quality of our interactions with one another and our environment. The System of Profound Knowledge was composed of four parts and their interactions. The four parts were:

- Appreciation for a system
- Psychology

- Knowledge about variation
- Theory of knowledge¹

Today the issues facing business and society are more daunting than ever. From our viewpoint, our economic well being and our survival on this planet are currently at extreme risk. Global climate change threatens mankind by destabilizing the earth's climate and ecosystems within which human civilization has developed for the last 10,000 years. We cannot continue with business as usual and expect things to right themselves without any need for us to change. We recognize that the problems we are facing will not be solved by the kind of thinking that produced those problems. If there were ever a time when we need to think differently, it is now when survival is threatened. We believe Deming's ideas as expressed in *The System of Profound Knowledge* can help us positively transform our modes of thought and our approach to our relationships with the earth. In the following, we will discuss climate change, what we see as some of the important ideas from *The System of Profound Knowledge*, and different ways to look at the responsibilities and practices of management. We have organized the discussion in sections beginning first with a short discussion on climate change followed by ideas and approaches that can be used to address this challenge framed by the four parts of *Profound Knowledge*, realizing that these are not independent of one another.

Climate Change Primer

The climate change issue has been around much longer than most people realize. In the 19th century scientists began theorizing that burning coal could increase CO₂ in the earth's atmosphere and raise temperatures at the earth's surface. By the middle of the 20th century science began measuring significant increases in atmospheric CO₂ and attributing those increases to human industrialization. By the dawn of the 21st century an international panel of over 2000 climate scientists, the UN Intergovernmental Panel on Climate Change (IPCC), concluded that the earth was warming and that the warming was likely due to human-induced increases in atmospheric greenhouse gases, especially CO₂.

People reasonably pose questions about climate change, such as: Is a warming climate a problem? Won't some people benefit from warming? If humans are a part of nature, isn't human-induced climate change indeed natural? Should we bother doing anything about climate change? Is all the current buzz about climate change just a fad that will pass?

These questions are not invalid, yet call for a deeper understanding that climate change represents not just warming, but significant change in climate stability. Civilization resulted from agricultural surpluses that liberated humanity from subsistence living and enabled specialization. Today agriculture, water systems, and population centers depend on stability in climate and are threatened by its significant disruption. Human-induced climate change can trigger over a matter of decades to centuries dramatic switches in climate that might have taken centuries to millennia to unfold through natural variation.

¹ Deming, W.E., *The New Economics*, 2nd Ed., MIT Press, 1994.

The speed and magnitude of these human-induced changes threaten the very processes and components upon which humans depend. Some of these threats include:

- increased intensity of extreme weather events including floods, droughts and heat waves;
- threats to major sources of fresh water for billions of people;
- reduction in agricultural yields through crop migration and changes in soil moisture;
- damage to indigenous species of trees and flora;
- severe impacts on habitats of humans, animals and insects;
- loss of balance between components of irreplaceable ecosystems; and
- significant rise in sea-level from a destabilizing of the ice shelves in Greenland and West Antarctica.

Appreciation for a System

Climate change can be viewed as a problem, but also as a symptom – an indicator of a lack of alignment between two systems - the complex interactive system that is planet earth and the global economy embedded within it. Accordingly, addressing climate change requires an understanding of systems.

Alignment and Optimization

A system can be defined as a grouping of interrelated and interdependent components in the service of an aim. In human designed systems, the aim is, or ought to be, a mindful and explicit value judgment. In natural living systems, the aim is not spelled out as a conscious purpose but rather understood as a characteristic set of behaviors in response to physical and biological laws.

If the aim and workings of a system are unclear or opaque, then the system can not be optimized. In human systems a clear aim reflects values, enables constancy of purpose, and provides for collective and cooperative effort. In all systems it is important to understand the interrelationships and interdependencies in the system. The performance of a system with regard to its aims will be suboptimal if each part is optimized without an understanding of the interdependencies of all parts working together. Every component and sub-process within a system must be aligned with the aim and workings of the overall system. Lack of alignment to aim can lead to sub-optimization, decay, and the ultimate destruction of the system.

Our planet, with its living and non-living components, is an extremely complex and interdependent system. The aim, as elucidated by evolutionary theory, is resilience and sustainability, or to put it in other words, the continuation of life. While living systems have evolved to ultimately align with that aim, one very powerful system on earth – the global economy – has not.

As a system, the global economy has been a powerful determinant in the development of civilization. For millennia humanity has used effort, ingenuity and natural resources to further economic development and human advancement. With the onset of the Industrial

Revolution, humans leveraged mechanization and fossilized energy, bringing about sustained levels of growth and industrial progress never before seen in human history. Fossil fuels magnified both the power and the impact of human industry.

Climate change indicates that humanity has misunderstood the systems relationship between the earth and the global economy. We have been optimizing the global economy and believed earth's natural resources existed to serve that aim. While this has brought about great development and wealth, we are seeing other less beneficial consequences. The human economy is beginning to dominate the earth's capacity for renewal. We are seeing unprecedented ecosystem degradation and species loss, depletion of natural resources and now human-induced climate change, the most urgent and dangerous indicator that the old ways of thinking are unsustainable.

To optimize the overall system means we must understand the interconnections and interdependencies between the global economy and the earth as a system. If the old way of thinking saw the earth in service of the economy, a new way of thinking sees the economy in service of the earth – the economy as a subsystem of the earth to be aligned with and shaped by the characteristic behavior of natural living systems on the earth.

The key to addressing climate change is through an appreciation for a system – taking the complex interactive system that is the earth and aligning the global economy to its aim. This has huge implications for all aspects of human development, from how we procure and use energy, to how we design, manufacture and use goods, to how we feed ourselves. New management tools and new ways of thinking will be needed to manage this shift.

From Competition to Coopetition

No one company or country alone can address a problem like human-induced climate change. Global problems require cooperation in order to be solved, and climate change is the “perfect” global problem in that it has almost no localized effect. CO₂ generated in the U.S. on a Monday is by Friday impacting the atmosphere over Brasilia or Beijing as much as Boston. The system of concern is the planet, so to optimize the system and achieve industrialization without destabilizing the earth's climate will require the cooperation of all the world's countries, both industrialized and developing. International negotiations are expected to result in a binding global treaty on greenhouse gas emissions in 2010. The treaty will determine whether and how the nations of the world can cooperate to bring down and eventually eliminate anthropogenic emissions of CO₂ and other greenhouse gases while preserving the world's remaining natural carbon sinks such as the rainforests of Brazil and Indonesia. Without cooperation and trust between nations the climate crisis will not be addressed, creating unknowable consequences for humanity.

Global collaboration on the climate crisis is akin to the cooperation shown in other areas such as global time and calendar standards, or information and communications protocols. One of the most indispensable tools of business today, the internet, would not exist but for collaboration and standardization. Creating standards encourages innovation, business development and wealth creation. The explosive growth of the information technology sector over the last forty years can be attributed to “Moore's

Law” which established a standard of performance for integrated circuits around which an entire industry could organize itself. Standards for greenhouse gas emissions will be no different. Competitors who cooperate on the common problem of climate change and then compete once standards are agreed to can all benefit.

A new term in the business lexicon that refers to this is *coopetition*. Coopetition was originally defined as the act of competitors working together in areas where no relative advantage existed in order to share common costs. But the meaning is evolving to reflect more of what W. Edwards Deming once advocated: “cooperate on common problems; then compete.”²

Deming also said, “Every example of cooperation is to the benefit of them that choose to cooperate.”³ This can clearly be seen by studying the signatories of the Kyoto Protocol. The Kyoto Protocol is an international agreement which took effect in 2005 imposing CO₂ emission reduction requirements on the industrialized nations in Europe as well as Japan, while transferring technology from the industrialized world to poorer countries to help them develop in sustainable ways. The U.S. never ratified the Kyoto Protocol fearing it would hurt our nation’s competitiveness. Although we were once the world leaders in the development of solar and wind power technologies, today countries like Germany and China – both of whom are cooperating under Kyoto – have taken over as renewable energy juggernauts due almost entirely to Kyoto-based incentives. Their cooperation on climate change has brought a huge financial benefit and invaluable expertise, while the U.S. refusal (up to now) to participate in a global treaty on climate change has put us further behind. Almost certainly the nation that leads the world in clean renewable energy will be a global superpower in the 21st century. Lack of cooperation on climate change is hurting U.S. competitiveness, not protecting it.

Rethinking Regulation

There is an ancient African proverb ‘If you want to go fast, go alone. If you want to go far, go together.’ In addressing climate change we have to do both – go far fast. *Going fast alone* can mean encouraging small innovative companies to pursue new knowledge for the next big breakthrough in energy or sustainable technology. *Going far together* can mean laying the ground rules required of everyone, i.e., getting the policy right. If we want to go far in addressing climate change, and if we want to get there fast by enabling breakthrough technology, we can only do this with the right policy and the right regulation.

That regulation can spur innovation is becoming more evident. An example is incandescent bulb technology. A federal energy bill passed in 2007 mandated standards of efficiency beginning in 2012 that cannot be met by current incandescent technology. This is creating a wave of innovation to make incandescent bulbs more efficient. “There have been more incandescent innovations in the last three years than in the last two

² Deming, W. Edwards, Lectures at Columbia University, Spring, 1991.

³ Deming, W. Edwards, Lectures at Columbia University, Spring, 1991.

decades,” according to Chris Calwell a researcher with Ecos Consulting.⁴ All this innovation – greater efficiency and better lighting – is driven by new regulation.

Another powerful use of regulation to drive innovation is through pricing. Putting a price on an activity or practice that once was free is a way to change behaviors away from that practice. Emitting CO₂ into the atmosphere is still free, in terms of accounted cost, in the United States. That lack of regulation is stifling the innovation that would ensue were there a price on carbon emissions. Many business models for new innovative technologies depend on this price signal on carbon to make their alternative energy products viable in the near term in the marketplace.

Well thought out regulation can provide clarity and reduce uncertainty for corporate planning and investing. For example, electric utilities must make strategic decisions about how to generate the energy their customers will need twenty to thirty years into the future. It is very risky for power companies to make such long-term investment decisions in an unsure regulatory environment. That’s why some utility-sector CEOs have been advocating for clear, consistent and reliable CO₂ emissions regulation. Companies need a price signal on carbon that only regulation can provide to make strategic decisions about the future. The sooner the U.S. Congress enacts robust, consistent and long-term greenhouse gas regulation, the better it will be for energy companies and the entire energy sector.

Interdependence and Aim

Curious people have always taken things apart in order to better understand how they work. Periods of great advancement in learning such as The Enlightenment saw everything from the motion of objects to the organs of animals being dissected, itemized and categorized – and new knowledge was born. Yet, as much as can be learned from breaking things into parts, much can be lost in overlooking the quintessentially important characteristic of systems – the connectedness and interdependence of their components and the emergent properties possessed by the system as a whole, but not by the parts.

System interdependence is the degree to which the action of each component affects and is affected by the actions of other components of the system. Degree of interdependence varies greatly from system to system. In viewing athletic teams as systems, both a bowling team and a basketball team exhibit interdependence – especially in terms of human social and psychological dynamics. But in terms of the operational aspects of the game, a bowling team is a much less interdependent system than a basketball team. If a bowling team aims to win, each player can align with that aim by trying to score as many pins as possible. If a basketball team aims to win, each player can not simply try to score as many baskets as possible. Instead players must understand each other’s capabilities and styles, and work together in the dynamics of the game to take advantage of strengths and minimize weaknesses. In highly interdependent systems, optimized individual performance will in general produce sub-optimal system results. So while optimizing individual performance may work for a bowling team – it will not for a basketball team.

⁴ Vestel, L.B., “Incandescent Bulbs Return to the Cutting Edge,” *New York Times*, July 5, 2009.

The greater the interdependence within a system, the more important is the need for clarity of and alignment with system aim, and the more critical is the role of management. A great orchestral performance relies on the management of the interdependencies between individual performances, which is the critical job of the conductor. No symphony orchestra can perform at a high level without a great conductor, and neither can a business enterprise. In business the manager must orchestrate the interdependent roles, responsibilities, interests, behaviors, and attitudes of customers, suppliers, employees, shareholders, creditors, communities and governments in service of the overall aims of the enterprise.

For a complex interdependent system with multiple aims and considerations, how we weight these aims and considerations affects how we view system performance. For example, if the aim of an orchestra were not beautiful music but rather improved return on investment or reduced cost, then we might see the traditional way an orchestra is conducted as very wasteful. We might wonder why the French horn section is paid to do nothing while the cellists and oboists are kept busy – or wonder why the rest of the organization sits idle during long piano and violin solos. An orchestra is a highly inefficient system – but efficiency was never the aim. Efficiency and other issues such as revenues and costs are considerations in running any orchestra – but they are not the aim. The aim is the creation of beautiful music, with the conductor responsible for aligning the different individual performances in service of that aim. What seems wasteful or inefficient from the perspective of one aim may seem sensible or indeed necessary when viewed from another. And what may seem to make sense in the short-term – an efficient orchestra – may prove to be unsustainable in the long term since nobody wants to hear an efficient orchestra.

Much as the idle musician is out of alignment with the aim of an efficient orchestra, capping carbon emissions is out of alignment with the aim of a cheap energy economy. Capping carbon emissions can only serve to increase the cost of fossil fuels – clearly in conflict with maintaining low energy prices in the short-term. Yet scientists are warning with ever increasing urgency that human industry must stop emitting vast amounts of carbon dioxide into the atmosphere or else the earth's climate system may become unstable. If the more urgent aim for the global economic system is sustainability for the long-term rather than cheap energy in the short-term, then constraining carbon emissions is not only sensible, it is necessary and indeed urgent.

As every business enterprise is an interdependent system, it is also linked to the global economic system which in turn is embedded in a system of the greatest complexity and interdependence – the earth and its interacting atmosphere, hydrosphere, biosphere and geosphere. As the global economy has reshaped the natural world in service of its own aims, the impact on the natural world has been enormous. The record loss of species, the endangerment of ecosystems and the reconfiguration of the atmosphere are cause for concern in their own right, but in such a highly interdependent system they presage even greater consequences for the future. The most urgent example of these is an increasingly warming world as a consequence of greater CO₂ concentrations in the atmosphere. In optimizing the global economy, we may be sub-optimizing the earth.

Energy Security, National Security and Climate Security

“The earth is finite ... fossil fuel reserves are finite ... (we have) to invent ways of living off renewable energy sources ... and to adjust our economy to the vast changes which we can expect from such a shift.” So said Admiral Hyman Rickover of the United States Navy in a speech he gave entitled *Energy Resources and Our Future* on May 14, 1957. Unfortunately, American policy makers and industrialists have failed to heed this urgent message. Instead, cheap oil has been the energy policy of the U.S. government and of American industry for the last half century. This has led to a situation today where we import two-thirds of the oil we use. If America is to prosper in the 21st Century, energy policy must now be viewed in the context of a system. We must consider the full cost of dependency upon energy sources in unstable parts of the world that are rapidly decreasing in supply just as global demand is soaring.

Addressing climate change addresses energy security. Renewable forms of energy like solar and wind can be sourced from within the U.S., reducing the risk of dependence on hostile nations and governments for a resource with such critical national security implications. But beyond energy, even broader national security threats await America if we fail to address climate change. For the first time, the Pentagon and intelligence agencies are taking a serious look at the national security threats posed by climate change.⁵ The military fears it will be increasingly called upon to deal with the humanitarian effects of violent storms, drought, mass migration and pandemics. Of even greater concern is the potential increase in the number of failed states due to climate stressed economies. These states tend to be breeding grounds for terrorist organizations and one failed state can destabilize an entire region. In appreciating climate change from a systems point of view, burning fossil fuel has hidden costs that are beyond measure.

In contrast to fossil fuels, renewable energy helps to align the global economic system with the earth and its climate system. Everything in the biosphere runs on renewable energy. More energy from the sun hits the earth’s surface in an hour than the entire global economy can use in a year. Yet today the U.S. economy gets less than two percent of its energy from renewable resources. If the full cost of fossil fuels is taken into account, the cost to our energy security, our national security and our climate security, then the low-risk and low-impact solar and wind energy sources are comparatively cheap.

Seeing Business as a System

To make appropriate changes to businesses and economies that take interdependencies into account, it is necessary to see them as systems. A diagram showing the business as a system can better represent a business than the typical organization chart. In a way, the organization chart destroys appreciation for the system by failing to help people understand where they fit in the system and what their job is. It shows only the responsibilities of reporting, conveying the message that reporting upward is more important than getting the job done. A system diagram, on the other hand, can be used as a way for employees to recognize who their upstream suppliers and downstream customers are.

⁵ Broder, John, “Climate Change Seen as Threat to National Security” *New York Times*, August 8, 2009.

Flowcharting can also be a powerful tool in addressing climate change and achieving sustainability. Creating a flow chart for a product realization process (or service realization process) can help management see where the interactions are with the external environment, see the “carbon footprint” – CO₂ inputs and outputs, and see how the business flow aligns (or is misaligned) with the ecosystem. For example, a process flow can indicate not only where the CO₂ and other greenhouse gases are generated in the process, but where there is waste being discarded to the environment or where there are processes generally not aligned with the overall ecosystem. Flowcharting can prompt new ways of thinking to reduce, eliminate or replace these processes with others that are aligned and thus become restorative to the overall system.

Considering Delayed Effects of Actions

Currently, we see the delayed effects of past actions. These effects include ongoing difficulties in the Middle East, unpredictable fluctuations in energy prices, degradation of the environment, and climate change. Lack of attention to potential future effects of actions we take can lead to devastating consequences.

The consequences of climate change lie in the future but the costs to address them – both financial and political – must be borne in the present. Changes by management to address climate change may not take effect for months or even years. The immediate effect may be negative to the bottom line. But management needs to be guided by consideration of potential future losses as much as by the next quarter’s numbers if they wish the company to survive and prosper. The leading companies in the 21st century will likely be sustainable enterprises aligned with the workings of the biosphere. The founder of Interface Carpet Company, Ray Anderson, was guided by such considerations.⁶ Anderson transformed his organization by aligning it to the principles of living systems. Interface now designs industrial carpet by studying such things as how a rainforest builds a forest floor. Interface’s vision is to sell every carpet it makes and then reclaim it at the end of its useful life, peel it apart and reuse every component in making the next new carpet. This process is called ‘closed loop’ recycling. And customers have responded enthusiastically. At Interface, looking to nature as a model brought innovation, reduced waste, reduced costs, reduced greenhouse gas emissions, new markets, and an involved and highly motivated workforce.

Building a sustainable enterprise requires the active participation of management at all levels. The first step is for executives to accept their joint responsibility to learn about sustainability. The move to name a Chief Sustainability Officer does not relieve members of upper management of their responsibility to understand the issue and to develop appropriate methods to address it. If a Chief Sustainability Officer is appointed, their responsibility should be to coordinate initiatives across functional areas, not to accept the responsibility for other members of management. The second step is to identify where greenhouse gases are generated in the system, where waste is being discarded to the environment, how that waste could be eliminated or transformed into a usable form, where energy is wasted, and where it can be used more efficiently. The

⁶ Anderson, Ray, *Mid-Course Correction*, The Peregrinzilla Press, 1998.

third step is to engage the entire organization in inventing new, sustainable ways to produce products and services.

Toyota Motor Corporation has also used thinking that is consistent with the principles of living systems. The biosphere is an interdependent, self-organizing system of seemingly infinite diversity and Toyota reflects these characteristics in organizing its work to produce low cost products in variety on a made-to-order basis.⁷ While neither Toyota nor any other manufacturer of fossil fuel powered automobiles can be considered a truly sustainable enterprise, the thinking that informed Toyota's efforts at managing work can be taken further and applied to make the types of products in the future that do align to the natural environment.

In addressing climate change there is opportunity for management to find immediate positive results. Energy efficiency provides opportunities for instant cost savings. A 2007 study by McKinsey & Company reported that forty percent of the reductions in greenhouse gases needed to significantly de-carbonize the global economy – and help stabilize the earth's climate system – can be done at a negative cost.⁸ However, other actions needed to transform an organization into a sustainable enterprise, such as changes in design, procurement, manufacturing, transport, and disposal – all directed by management – have higher upfront costs and delayed returns. But such a transformation is going to be essential for successful companies in the 21st century.

Understanding Employee Goodwill

Companies are finding today that when they choose to address issues like climate change and sustainability it attracts a great deal of employee interest. IBM has a global sustainability program which was started by individual employees concerned with making their workplace more environmentally sound. In one plant in Ireland nearly 200 employees volunteered to look at ways their company could reduce waste, reduce greenhouse gas emissions and otherwise be more efficient and thus less environmentally damaging.

Management should always provide a clear understanding of the organizational aim and system flow to enable individual workers to know what their job is, how their job fits in with the work of others and how it contributes to the aim of the system. When this is related to sustainability and addressing climate change it transcends the usual business priorities, and there is an abundance of goodwill in employees that can be tapped. As an organizational aim, addressing climate change seems to be more personal, connecting workers' jobs to their lives outside work including their families and children. Individual workers are thus able to engage not just their labor but their hearts and minds, and thus understand what it means to do a good job, feel fulfillment and take joy in work.

⁷ Johnson, H. Thomas, *Profit Beyond Measure*, The Free Press, 2000

⁸ "Reducing Greenhouse Gas Emissions – How Much at What Cost," McKinsey & Co., December, 2007.

Recognizing Information Intensity and Energy Efficiency

Ramon Margalef, the great Spanish ecologist, once said that an ecosystem can be thought of as a physical system that transmits and stores both energy and information.⁹ In general, nature rewards resource conservation. As ecosystems develop and mature they go from being resource hungry and energy intense to becoming resource conserving and information intense.

Human economic development appears to be progressing very differently. In the 200 years since the dawn of the industrial revolution, the global economy has been on an increasingly energy intensive path. The technological society of today is four to five times as energy intense as early industrial societies, and 100 times as energy intense as advanced agricultural societies.¹⁰ Such energy intensity is sustainable neither from the point of view of fossil fuel supply nor from the perspective of its climate impact.

In order to create a more sustainable economy, humanity can study our living planet as a system to provide direction and instruction. Janine Benyus writes in *Biomimicry* that nature runs on sunlight, uses only the energy it needs, fits form to function, recycles, rewards cooperation and diversity, curbs excesses, and taps the power of limits.¹¹ The earth's ecosystem has developed to become a very information intense system. E.O. Wilson, one of the world's foremost biologists, pointed out that one strand of one chromosome of a domestic mouse has more information content than an entire set of encyclopedias. Biological systems use this information intensity to make efficient use of energy through self-regulation and self-monitoring. As an ecosystem develops, information intensity increases as energy intensity decreases. Robert L. Olson once wrote, "It is information processing, the vast majority not of a 'conscious' type, that has made the biosphere's self-regulation and evolution possible."¹²

Perhaps this is the model for global economic development: using information as a key to resource conservation; i.e., creating a more information intense and more energy efficient system that emulates the biosphere from which it emanates. But another key to biological systems is that information is embedded in the systems themselves, not carried in separate vestigial structures that are in constant need of updating. Biological systems carry their information with them and use it in the context of and as a part of their development. Information is not kept in separate storage.

Managing the Organization's Work

The idea of properly managing energy and information applies also to the everyday work of an organization. The mental and physical energy of the people of the organization can either be wasted or used for innovation and improvement. How well information is managed – guarded and controlled or made available and accessible – can also affect organizational performance.

⁹ Margalef, Ramon, *Perspectives in Ecological Theory*, University of Chicago Press, 1968.

¹⁰ Cook, E., "The Flow of Energy in an Industrial Society," *Scientific American*, 1971, p. 135.

¹¹ Benyus, Janine, *Biomimicry*, Harper Collins, 1997

¹² Olson, Robert L., "Nature's Advanced Technology," *Humankind Advancing*, Vol.3, No.4, October, 1992.

When systems of review and reward generate competition between individuals and groups or functions in an organization, energy is spent competing rather than developing new ideas and better methods. When employees are forced to attribute variations in results to specific causes when they are a function of the noise within the system, this wastes energy and propagates further waste. When information and communication systems contain unnecessary redundancy and overlap, energy is wasted in repetitious activity and attempts to resolve confusion. An example is the American healthcare system. Because of the lack of electronic medical records and the lack of commonality of reporting requirements by different insurance providers, there is tremendous waste of human labor and cost. Waste occurs when internal customer-supplier relationships are not recognized and improved. Further waste occurs when purchasing decisions are made on the basis of price without consideration of cost of use. Even more waste and cost occurs when the needs of customers are ignored.

Seeing the organization itself as a system and managing it to effectively use its resources has great potential payback in any business environment, but in an age of human-induced climate change it is an urgent necessity.

Psychology

History is replete with examples of ideas and theories that once were widely accepted and then were overturned. Galileo's work on the sun-centered system earned him house arrest in the latter part of his life, but ultimately the theory of an earth-centered system was abandoned. Pre-Darwin Western thinking viewed the biosphere as humanity's own stockroom – a static unchanging place we owned and could use as we wished with few or no consequences. After Darwin's ideas were widely accepted, scientists began viewing the biosphere as a dynamic and changing system – something we didn't own but rather were part of and to which we owed our continued existence. Human-induced climate change makes our interdependence with the biosphere even clearer.

Re-examination of Assumptions and Roles

We make use of cognitive and inferential tools to interpret the world. Those tools are powerful, but subject to error. MIT Sloan School Professor Edgar Schein wrote of organizational culture as basic assumptions that have appeared to work well enough to be considered valid and so are taken for granted and tend to drop below the level of awareness.¹³ Those assumptions are then used to interpret the world and to deal with the external environment. When the environment changes and the organization's assumptions do not, the organization is at great risk. An understanding of the need to continually examine and re-examine our assumptions about the nature of reality improves our abilities to deal effectively with the world.

There are two contexts in which the employees of an organization have an effect on climate change. The first is in their lives outside the organization. The second is their contribution to the organization's efforts to address climate change. It is assumed here

¹³ Schein, Edgar H., *Organizational Culture and Leadership*, Jossey-Bass, 1990.

that the organization will work to educate employees about climate change and the obligations the organization and they as individuals have to ensure a viable future. Provision of information and education are necessary, but not sufficient, to unlock the abilities employees may have to contribute to the organization's efforts. Psychology has much to offer the organization in its efforts to unlock those abilities.

In *The Human Side of Enterprise*, MIT professor Douglas McGregor identified what he called Theory X: "The traditional view of direction and control." He identified three basic assumptions about human nature and behavior that underpin Theory X: "1. The average human being has an inherent dislike of work and will avoid it if he can....2. Because of this human characteristic of dislike of work, most people must be coerced, controlled, directed, threatened with punishment to get them to put forth adequate effort toward the achievement of organizational objectives....3. The average human being prefers to be directed, wishes to avoid responsibility, has relatively little ambition, wants security above all."¹⁴ McGregor proposed Theory Y, based on very different and far more positive assumptions about the nature of people. Deming adopted a positive view of people as well. In his book, *The New Economics*, Deming wrote about the role of a manager of people. Deming asserted that a manager of people "understands that people are different from each other. He tries to create for everybody interest and challenge, and joy in work..." He also stated that the manager of people "understands the interaction between people and the circumstances that they work in." The manager of people "creates trust. He creates an environment that encourages freedom and innovation..."¹⁵

Management of People

Nearly fifty years ago, Harvard psychologist Chris Argyris wrote of the "psychological contract," unwritten expectations of the employer and the employee.¹⁶ According to Argyris, the employer's expectations included loyalty and commitment to the organization. The employee's expectations included a sense of dignity and worth, fair treatment, and opportunities to learn and grow. Psychologists have reported on breaches of the psychological contract that include failure to provide career guidance and mentoring, poorly defined job responsibilities, lack of resources to perform the job, and lack of recognition of accomplishments.

Many psychologists have written about employees' perceptions of fairness in the workplace. One area in which employees make judgments of fairness is in distribution of resources and pay. Employees may have different criteria for distribution of resources and pay, depending on the context. When the context is non-threatening, employees tend to think that reward should be commensurate with effort, as they perceive it. These perceptions usually don't take context into account appropriately. The effects of management and other components of the system tend to be ignored. When the situation is threatening – for example, when the organization announces layoffs – employees may adopt a more humane viewpoint and tend to believe that it is more fair for employees

¹⁴ McGregor, Douglas, *The Human Side of Enterprise: Annotated Edition*, McGraw-Hill, 2006.

¹⁵ Deming, W. Edwards, *The New Economics*, 2nd Ed., MIT Press, 1994.

¹⁶ Argyris, C., *Understanding Organizational Behavior*, Dorsey Press, 1960.

who are younger and do not have dependents to be laid off before older workers who will have difficulty finding another job.

Employees also judge the fairness of processes used to make decisions and the adequacy and honesty of explanations that are provided for those decisions. The respect and courtesy shown to employees also affects their perceptions of fairness. Employee perceptions of fairness can strongly affect their attitudes and willingness to contribute to the organization's efforts. The human resources function in an organization has an opportunity to contribute to organizational performance in all areas by ensuring that managers at all levels are thoroughly educated regarding appropriate ways to manage people, as well as ensuring that managers understand their role as models.

There are other opportunities for improvement of organizational performance by examining the organization's systems. Organizational policies and rules can communicate lack of trust, offend the dignity of employees, and generate cynicism in the organization. Reward systems that create destructive competition and negative interactions, rather than collaboration, between individuals and groups can subtract from the organization's ability to deal effectively with the external world. The ability of employees to trust each other and their managers affects their willingness to freely exchange knowledge and information that may affect the quantity and quality of innovative ideas. Undoubtedly, an organization's efforts to deal with climate change will require organizational change. The discipline of psychology has much to say about effective and ineffective approaches to change.

A connection can be made between appreciation for a system and the effective use of psychology in the workplace. Each member of the human species is a system; he or she is not two systems: a work system and an outside of work system. What happens to the individual in the workplace affects his or her attitudes and behavior toward his or her family, neighborhood, and larger community. Damaging employees' sense of dignity and worth may have strong negative effects outside the workplace. Giving the employee opportunities for growth and challenge in the workplace may equip the employee to make larger positive contributions outside the workplace.

Deming knew that transformation could not take place without driving fear out of the organization. By fear, Deming was not referring to that which comes from a physical threat – such as the one presented by climate change. He was referring to the fear within the workplace that saps people of energy, takes their focus away from the organizational aim, damages cooperation and constancy of purpose, and leaves people thinking about their own self-preservation. Driving out fear and building trust can unlock the creative potential that will lead to innovation and sustainability.

As climate change transforms the human systems that are corporations, psychology will play a key role in determining whether and how these corporations succeed. Given the mountains of scientific evidence, the decades of peer-reviewed vetting, and the magnitude of the threat posed, one may question why American society has not acted sooner and more swiftly. The answer is, in part, bound up in human psychology.

Understanding the psychology of individuals and groups and putting that understanding to work can improve the lives of people and the effectiveness of organizations. On a larger scale, an understanding of psychology can help to design approaches that will help society at large become more knowledgeable of the effects of climate change and the human population's role in acting to prevent further damage to the biosphere.

Knowledge about Variation

The high temperature in Manhattan varies from day to day, as does the number of traffic accidents in Los Angeles, the number of deaths in Dallas, and the number of births in Chicago. Likewise, revenue from sales of products or services, expenses for electricity, costs for warranty, legal expenses, and direct labor costs vary from month to month. Measured amounts of carbon dioxide and other greenhouse gases in the atmosphere, surface temperatures on land and in the ocean, number of hurricanes, number of tornadoes and other climatic indicators vary from year to year. We are surrounded by variation. Since this is the case, how do we make sense of the numbers that come our way? What do the fluctuations in the numbers mean? Do we ascribe too much meaning or too little to the fluctuations? Can we use the numbers to predict with a high degree of belief what the future holds? What kinds of actions should we take to change the future? These kinds of questions have importance to managers of business and to inhabitants of the earth. Some understanding of variation can be helpful to answer those questions.

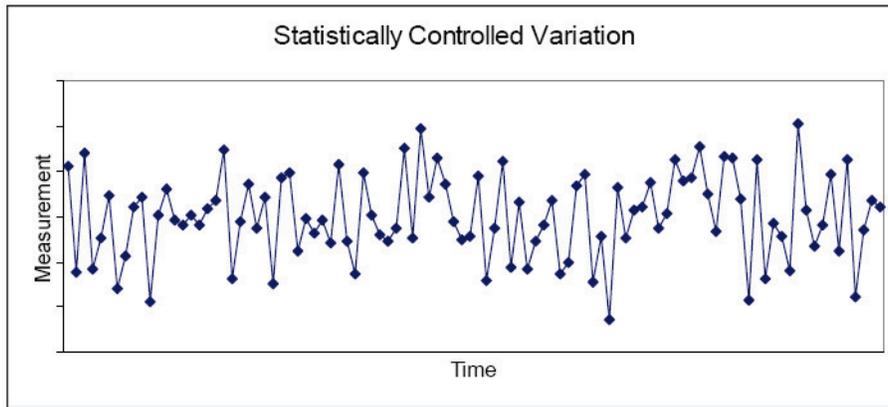
Interpreting the Meaning of Variation

Walter Shewhart, a physicist at Bell Labs, provided a way to look at variation that can be very helpful in interpreting the meaning of variation in series of numbers. His aim was to use the messages in variation as a guide to better actions in management of business processes and better use of data in prediction. Although his focus was economic control of quality in manufacturing, his ideas can be applied in other contexts. Deming applied Shewhart's ideas to business organizations in general, speaking in particular to managerial thought and action.

Shewhart and Deming used a particular concept to look at variation in series of numbers. That concept was statistical control. The concept of statistical control and the use of some simple tools to analyze series of numbers enabled them to make judgments about the causes of variation in series of numbers and thus avoid the mistakes and waste associated with misinterpretation of variation and misidentification of causes of that variation. Figure 1 is an attempt to illustrate the concept of statistically controlled variation.

Statistically controlled variation in any series of results or measurements shows no discernible patterns, the results vary around the same average over time, and the degree of variation stays about the same. Variation of this kind is referred to in some disciplines as "white noise." When a series shows statistically controlled variation, it makes no sense to try to find specific reasons, or causes, for the individual up and down fluctuations in the series. Shewhart called the causes of statistically controlled variation "chance" causes; Deming referred to those causes as "common." The general idea was

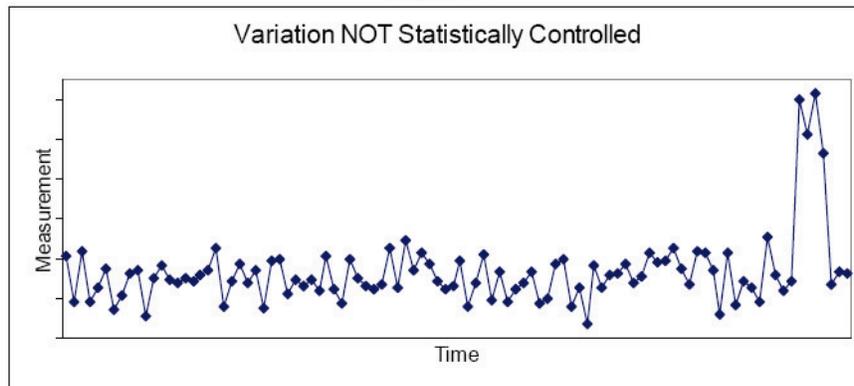
Figure 1



that the fluctuations – the variation – were produced by a set of causes that were always acting on the results and whose effects combined to produce noise. Common causes were built into the system that produced the results. If nothing were done to the system that affected the causes of variation, then future results would look the same: they would exhibit the same behavior as past results. In many cases, the variation in white noise might be greater than desired. If that were the case, a reduction in variation would be accomplished by using various methods to identify sources of variation that take into account the structure and dynamics of the system and act appropriately on those sources.

Figure 2 shows variation that is not statistically controlled. It would be natural to ask what affected the four points near the right-hand side of the graph that are noticeably different from the others. The first question would be, “What happened?” The next would be, “What caused that?” Shewhart took unusual data points such as the ones shown in the graph as signals of what he called “assignable causes.” Deming used the term “special” causes. Since the scale on which data are plotted can influence the picture of the variation, Shewhart developed a method to identify signals of special cause called the statistical control chart. Statistical theory provided a means to define how much variation of what kind would exist in a collection of data when only common (chance)

Figure 2



causes were affecting the results. Variation in excess of that amount or unusual patterns in the data provided signals of special causes.

Patterns in Variation

Variation that shows a clear pattern that is not noise is also not statistically controlled, but this type of variation can sometimes be modeled and theories can be constructed about the causes of the pattern. The variation in Figure 3 is clearly not statistically controlled. The numbers are monthly figures for U.S. Balance of Trade.

It would be relatively easy to use statistical methods to establish a model for the data. It is common practice to do this with data such as that shown in Figure 3. The model is then used to make predictions of future results. Since this amounts to extrapolation beyond the time range of the data available, predictions such as this are subject to uncertainty beyond what statistical theory would indicate. In such a case, knowledge of the subject matter is required to have any substantial degree of belief that the prediction will be accurate. In the picture shown in Figure 3, any statistically-based prediction would indicate that balance of trade figures would continue to grow more negative.

Figure 3

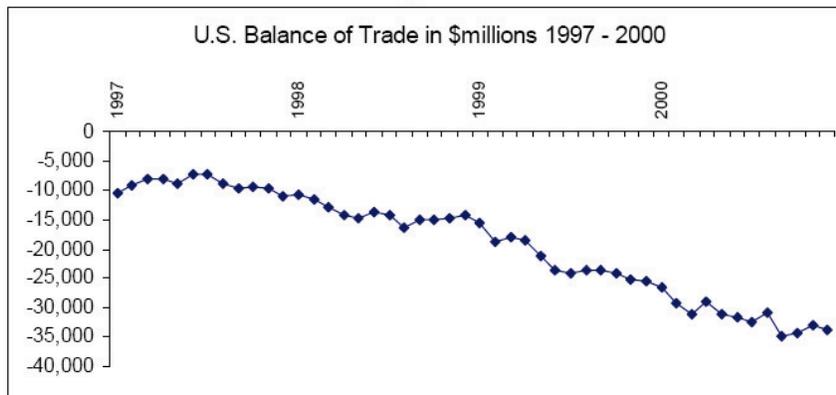
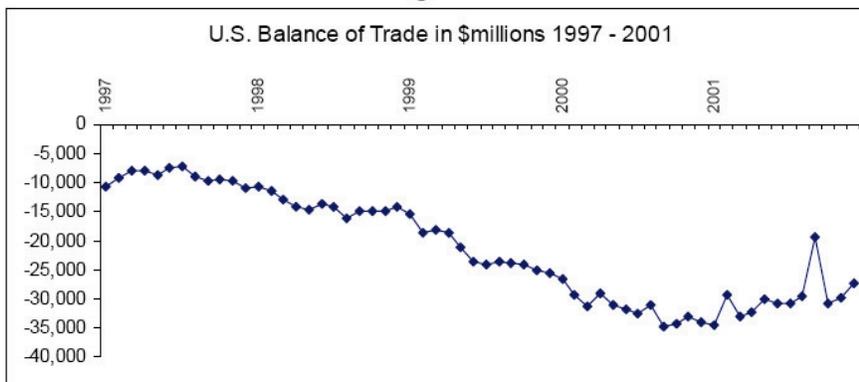


Figure 4 shows what actually happened in 2001. In addition to a general upturn in the

Figure 4



figures, there is a signal of a special cause: a consequence of 9/11. If there is no subject matter knowledge to explain the pattern of behavior in a series of results that does not exhibit statistical control, then predictions of the future based on the past are subject to great uncertainty. Additionally, rare events can occur.

Figure 5

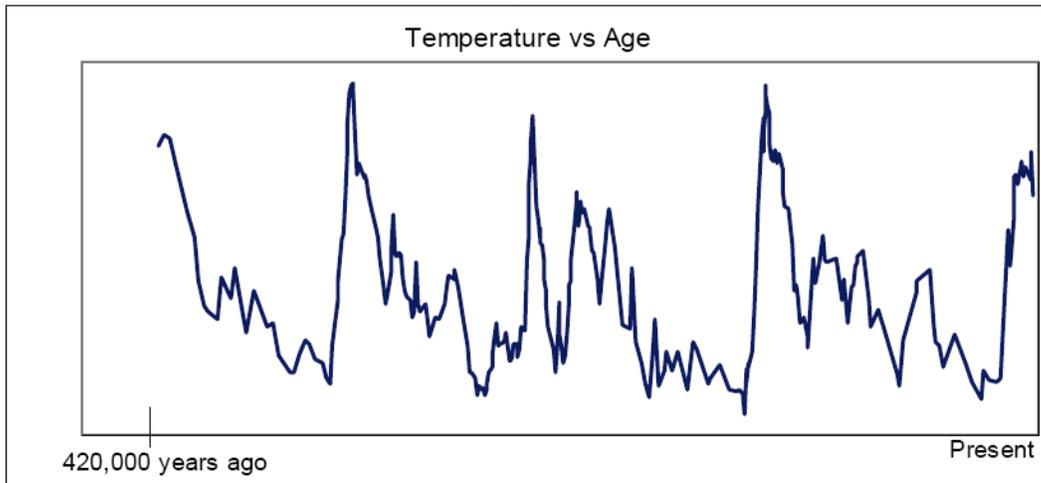
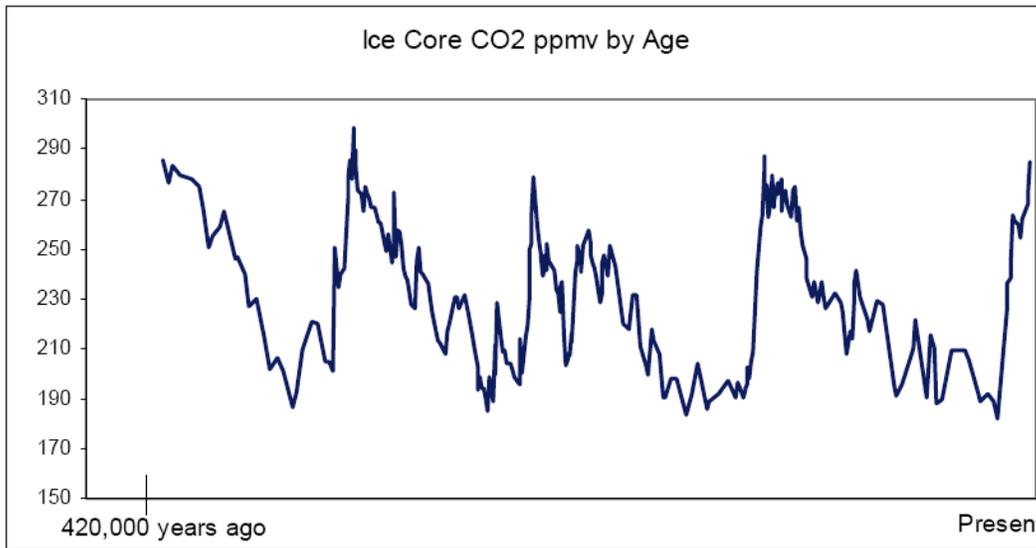


Figure 6



From Petit, J.R. et al, 2001, Vostok Ice Core Data for 420,000 years, IGBP PAGES/ World Data Center for Paleoclimatology Data Contribution Series #2001-076. NOAA/NGDC Paleoclimatology Program, Boulder, CO, USA
obtained from <ftp.ncdc.noaa.gov/pub/data/paleo/icecore/antartica/vostok>

There are cases in which widely held theories exist to explain patterns of behavior in series of results. Of course, predictions of the future are still conditional: “IF the cause

system remains as it was, this is what can be expected.” Figures 5 and 6 show data from ice cores obtained in Antarctica. Figure 5 shows fluctuations in temperature over a period of roughly four hundred thousand years. Figure 6 shows measurements of carbon dioxide in parts per million. Clearly, these two series are not simply white noise. They both show a clear cyclical or periodic pattern. Further, the pattern is very similar for the two series; the series exhibit correlation. Both of these series illustrate variability in climate over four hundred thousand years. Scientists relate the periodic behavior to the Milankovitch cycles which are governed by the precession, obliquity, and eccentricity of the Earth’s orbit.¹⁷ The amplitude of the fluctuations in temperature over the period of the ice core data is greater than would be expected from orbital effects alone. One explanation for the increased amplitude is that factors within the climate system interact dynamically with one another to increase the fluctuations in temperature. When temperature warms due to orbital changes, carbon dioxide levels in the atmosphere rise. One explanation for this is that as atmospheric temperatures rise, ocean water temperatures rise, and warmer ocean water holds less carbon dioxide so that atmospheric carbon dioxide rises as well. The dynamics of the situation are explained as a reinforcing feedback loop. Understanding of the earth’s climate as a system helps to explain the variation. However, atmospheric carbon dioxide levels are now approaching values that are thirty percent higher than the highest values seen in the ice core history. Predictions of atmospheric carbon dioxide levels based on the ice core data and theories explaining them would never result in predictions of atmospheric carbon dioxide levels as high as they have been recently. This appears to indicate that something else besides periodic variation predictable by Milankovitch cycles and the dynamics of climate is present in the recent past.

The graphs in Figure 7 show recent history of global temperature and carbon dioxide levels.¹⁸ These graphs show a lack of statistical control for a much shorter time span than before. One notable aspect of the carbon dioxide graph is that the rate of increase in the figures appears to increase beginning about 1960. Again, there is correlation between the two kinds of measurements. Some of that correlation can be explained by the same positive feedback mechanism mentioned earlier. However, “analysis of isotopes, which can distinguish among sources of emissions, demonstrates that the majority of the increase in carbon dioxide comes from combustion of fossil fuels (coal, oil and natural gas).”¹⁹

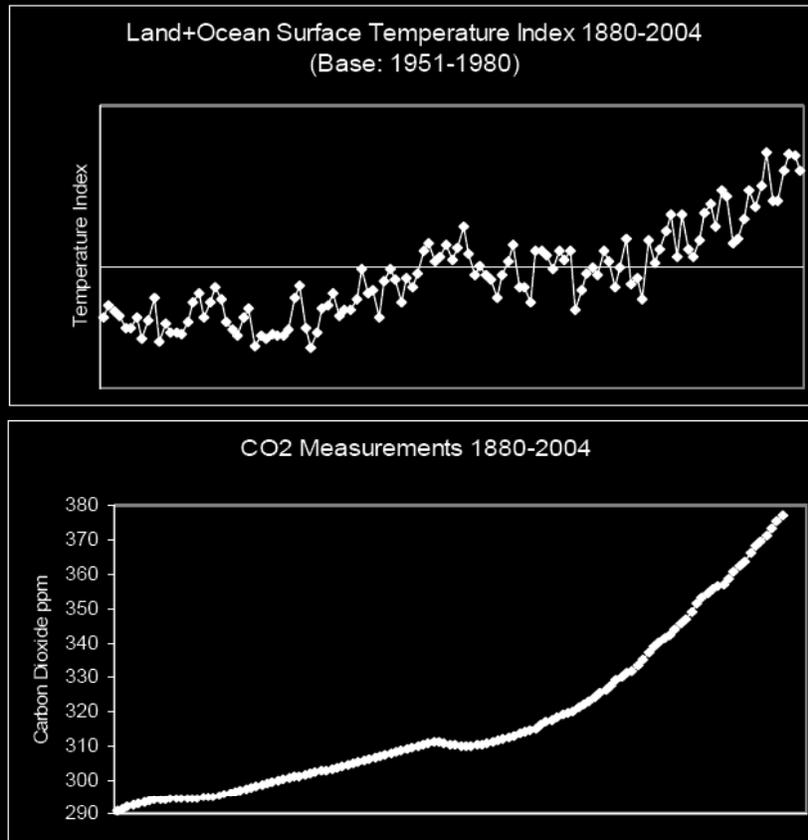
The increase in carbon dioxide then contributes to what is called the ‘enhanced’ greenhouse effect, the result of large scale burning of fossil fuels, leading to global warming beyond what would be expected to occur naturally. The natural greenhouse effect has long been understood. “The greenhouse effect refers to circumstances where the short wavelengths of visible light from the sun pass through a transparent medium

¹⁷ Precession is change in direction of the earth’s axis of rotation; obliquity is the inclination angle of the earth’s rotation axis in relation to its orbital plane; eccentricity refers to how much the earth’s orbit deviates from a circle – eccentricity changes as a result of gravitational attractions among the planets.

¹⁸ Source for Temperature Index Data: <http://data.giss.nasa.gov/gistemp/graphs/fig.A2.txt>. Source for CO2 Figures: GHGs.1850-2004_GISS2004

¹⁹ Collins et al (2007), “The Physical Science behind Climate Change,” *Scientific American*, 297(2), 64-71.

Figure 7



and are absorbed, but the longer wavelengths of the infrared re-radiation from the heated objects are unable to pass through that medium. The trapping of the long wavelength radiation leads to more heating and a higher resultant temperature. Besides the heating of an automobile by sunlight through the windshield and the namesake example of heating the greenhouse by sunlight passing through sealed, transparent windows, the greenhouse effect has been widely used to describe the trapping of excess heat by the rising concentration of carbon dioxide in the atmosphere.”²⁰ This is known as the enhanced greenhouse effect since human activity and the resultant increase in concentrations of atmospheric CO₂ have enhanced the natural greenhouse effect, with greater concentration of carbon dioxide allowing less heat to escape into space.

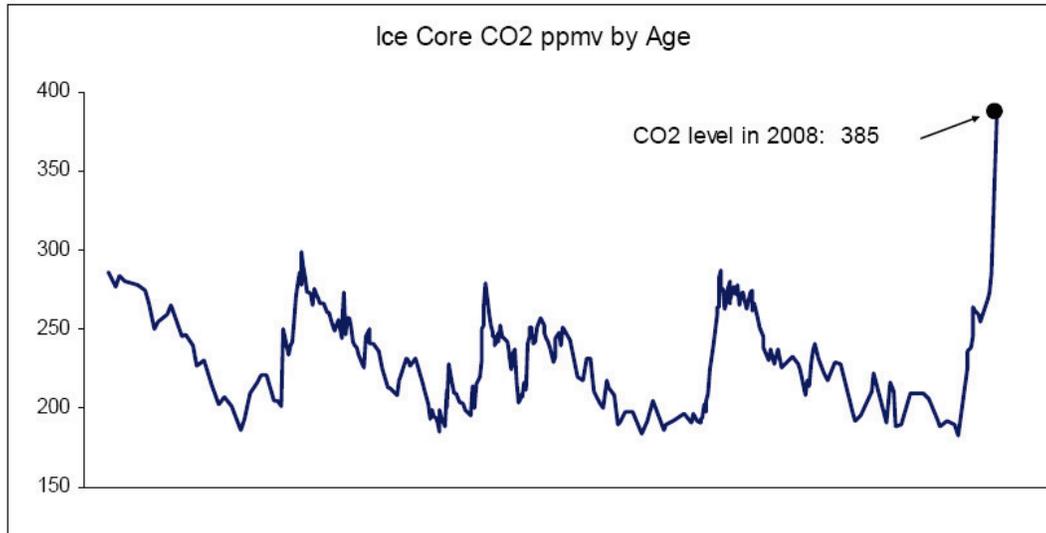
Figure 8 is the same as Figure 6 except one point has been added. The additional point is the level of carbon dioxide recorded in 2008. It is clear from this picture that there has been a change that would not have been predictable from hundreds of thousands of years of earth’s history. One rational explanation appears in the previous discussion.

Deming often said “Management is prediction.” Today scientists are predicting that unless human industry radically changes course from business-as-usual, the concentration

²⁰ <http://hyperphysics.phy-astr.gsu.edu/hbase/thermo/heat>

of CO₂ in the earth's atmosphere will be higher by mid-century than it has been in over fifty million years – a time when the earth's climate was very different and much hotter. Is there a role for the management of a business enterprise in addressing the uncertainties associated with this apparent long-term trend? Is the role to mitigate against such an eventuality? To adapt to it? Or perhaps some combination?

Figure 8



Using Knowledge about Variation in Management

Knowledge about variation has contributed to understanding of the earth's climate and it can also contribute to management of a business enterprise. Although Shewhart's methods have been applied often at lower levels in organizations as tools to manage and improve individual production and service processes, their potential for benefit may be orders of magnitude greater when applied at executive levels of business organizations. Interpretation of variation using Shewhart's methods can guide actions aimed at improvement of business performance. One benefit is reduction of enormous waste and complexity brought about by incorrectly reacting to variation.

Figure 9 shows a statistical control chart constructed from the data described earlier as "white noise," that is, statistically controlled variation. The upper and lower statistical limits define the limits of common cause variation that could be produced by the system that produced these data. Since there are no points outside these limits and no discernible patterns in the data, the variation is judged to be statistically controlled. The conclusion is that this is the variation that the system produces and, as long as no change is made to the system, the future will look like the past: future results will vary within these same statistical limits. The statistical limits define the variation the system is capable of producing. If a result beyond the statistical limits is desired, an appropriate change will have to be made to the system. The system includes the people who work in it; generally, people who work in the system do not have the authority to make significant changes to the system. Setting numerical goals or targets outside the boundaries of the system's