

## Lesson Five: Quality “Control” and Continuous Improvement

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### A. Key Learning Points

1. “Over-control” occurs when managers manage each individual task, activity, or event as a unique or special event. Excessive control and inspection is costly, demoralizing, and unnecessary.
2. “Under-control” occurs when managers manage tasks, activities, or events randomly based on occasional and/or inconsistent attention. Under-control can be costly, ineffective, and dangerous.
3. “Quality control” occurs when managers understand the difference between special or unique tasks, activities, and events and common tasks, activities, and events. Quality control is cost-effective and productive because it focuses on common causes that effect the overall system performance.
4. Managers who use quality control emphasize performance patterns and trends that describe the capability of work processes and systems.
5. Because 80 percent of the problems in a business are typically caused by 20 percent of the issues, high-performing businesses prioritize the issues that, once addressed, will make the biggest difference. This is called the Pareto Principle. The Pareto Principle emphasizes distinguishing the “significant few” issues in a business from the trivial many issues.
6. The Deming (or Shewart) Plan-Do-Study-Act cycle is a systematic framework for quality improvement.
7. When each of us teaches a co-worker, friend, or family member about quality, the potential for quality improvement at work, at home, and in our community expands exponentially.

### B. Real World Examples and Considerations for Practitioners

Special Note to Students: *Some* of these examples and observations will be familiar to students who have completed BA 1150 Introduction to Quality Improvement

1. Managers tend to take a short-term view of quality improvement. As a result, they tend to over-react to individual incidents that may be either positive or negative. Such over-reaction results in increasing variation in the process that threatens customer confidence and increases costs.

For example, on the first week of October a restaurant experiences an unusually high volume of customers that, in turn, contributes to slow service and shortages of basic menu items. Applying short-term thinking, the manager decides to add wait staff and increase his orders for food supplies to meet expected increased demand in the second week of October. Demand, however, in the second week returns to normal and the restaurant is over-staffed and over-supplied. The following week, the manager cuts staff levels and offers menu “specials” at reduced prices to sell the excess food inventory. A longer term management perspective in this case would determine staffing levels and food orders based on deeper understanding and greater historical information about customer volume and seasonal variation based on tourism or special events (like the state fair or international balloon fiesta in Albuquerque) that drive unusual or “special” events.

On a personal or family level, parental over-reaction to individual incidents in their child’s behavior tends to have adverse impact on the child’s overall development. When disciplined or educated for short-term results, the child soon learns to succeed or survive within a narrow context that emphasizes immediate behavior at the expense of longer term judgement, learning and growth. [This also is a familiar scenario for relationships between micromanaging supervisors and staff].

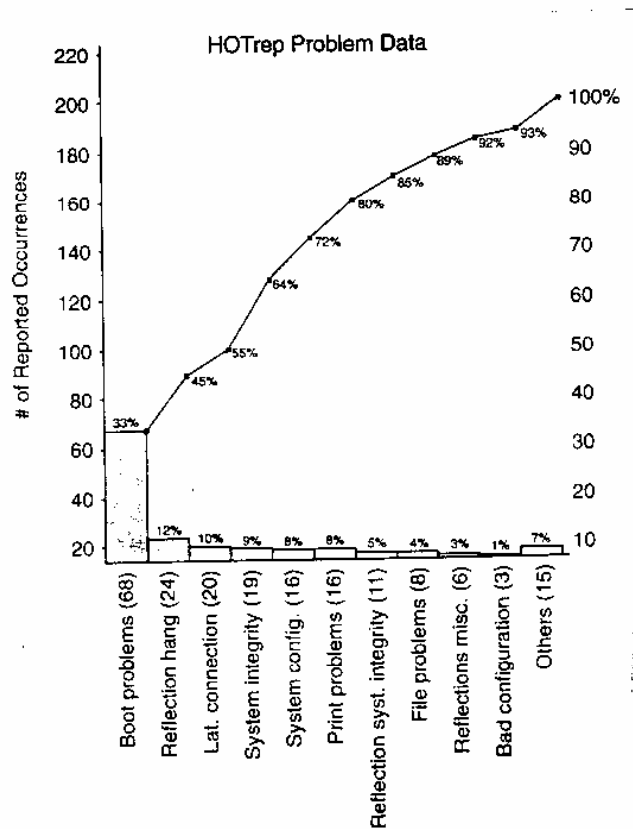
Here are more examples that Dr. Deming used to explain the hazards of “tampering”:

- (over) reaction to a customer complaint
  - (over) reaction of the stock market to daily news
  - foreman resetting a process at the beginning of his shift based on yesterday’s performance
  - changing company policy based on the latest attitude survey
  - continual change in tax laws, each change to try to correct a previous mistake
  - price wars among competing businesses
  - use the last batch to set the standard for the next one
2. When analyzing performance patterns and trends, there are four basic tests that quality managers use to understand variation:
- a. Is there one or more points that seem extreme, special, unique, or improbable compared with the general run of data? Such extreme data points typically result from special causes. For example, there was a labor strike, or a fire, or extreme weather that delayed shipment of goods.
  - b. Is there a non-random pattern or cycle of performance? Non-random patterns or cycles show that performance variation is not random. For example, in many businesses there is a weekly cycle of productivity and quality that is highest at mid-week and lowest on Friday. Likewise, productivity and performance may vary consistently among business units or work shifts.
  - c. Is there a run of seven or more consecutive points in one direction? Runs of seven show that the system is beginning to change (for better or worse).
  - d. Is the data too close to average? Data that is too close to average suggests the data, experiment, or work performance was manipulated or tampered with to achieve the desired specification.
3. The Pareto Principle emphasizes the importance of focusing on the problems that offer the greatest potential for improvement. Successful quality efforts focus first on the significant few performance improvement opportunities. They avoid squandering precious resources on comparatively trivial improvement projects.

A Pareto Chart is a quality tool that helps businesses identify and prioritize improvement opportunities. The Figure below is a Pareto Chart from SmithKline Beacham that illustrates the comparative frequency of incidents that contribute to poor quality.

Incidents are organized into the problem categories shown on the horizontal axis. The problem categories are listed in descending order from left to right with bars above each problem category to indicate its frequency or cost. The most frequent problem category, boot problems in this example, is listed first.

In addition to the bar chart format, some Pareto Charts, show a cumulative percentage line that illustrates the extent to which each successive problem category contributes to the total problem. In our example, there were 68 boot problems that represent 33% of all the problems. Likewise, the cumulative percentage line shows us that the combination of boot problems and reflection hang problems represent 45% of all the problems.

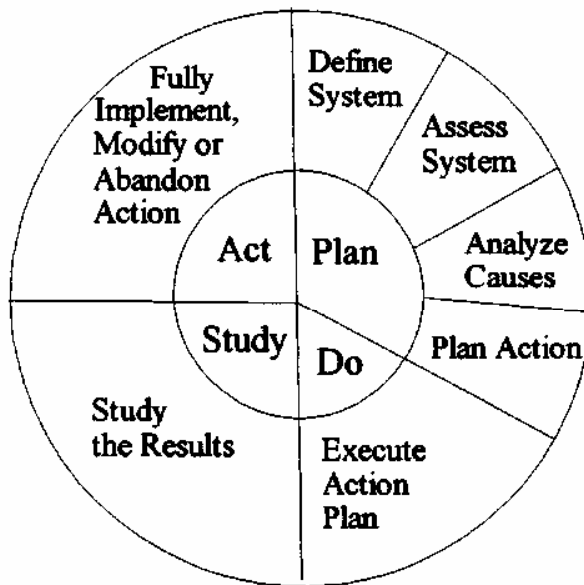


Information provided courtesy of SmithKline Beecham

The SmithKline Pareto Chart makes it clear that resolution of boot problems is the priority improvement opportunity. Without this data, an improvement team might select another, comparatively trivial, problem to address.

It is amazing how poorly many companies select improvement initiatives. Without pareto analysis, many companies select improvement projects based on convenience, intuition, politics, or pure whim. Their results, not surprisingly, are poor.

- Dr. Deming recommended we use the Plan-Do-Study-Act cycle to guide and manage systemic quality improvement efforts. The figure below illustrates this "Deming" cycle. Dr. Deming believed successful organizations: Plan before they do; Do what they plan; Study what they have accomplished; and, Act on what they have learned (Keep it; Modify it; Abandon it; Try Again.)



5. Most of us have worked for organizations that use the Deming cycle in selective areas. For example, many businesses have substantial strategic and operational Plans, although fewer companies actually deploy or execute (Do) those plans effectively. Even more companies tend to work (Do) with great effort but limited or no planning. When we do not plan what we do, it is difficult to know (Study) whether our effort made a difference. Sometimes we confuse “doing” something with “succeeding” at it. We assume that our efforts are enough and fail to Study the results of our labors. Whether we succeed or fail, our organizations are stronger and more profitable when we share and apply (Act on) what we have learned throughout the business. If a quality initiative succeeds in one team or unit, it’s likely it will succeed in other teams or units. The Deming cycle helps us accomplish this objective.

Continuous improvement is a long-term process that requires discipline and perseverance based on the Deming Cycle – Plan what you do; do what you planned; study what you achieved; act on what you know. Improvement efforts that lack continuity tend to increase performance variation. On the one hand, intermittent efforts do tend to achieve periodic “spikes” or runs of exceptional success. On the other, intermittent efforts do not sustain such high performance and subsequently lapse back to prior capabilities. This is frustrating for all parties – shareholders, employees, and customers - because the business at times shows great potential and value but more often disappoints. This also is very costly because the business is forced to renew and repeat improvement efforts rather than building learning and improvement systematically and continuously into its infrastructure. Although many managers tend to stress “improvement”, the single greatest contributor to improvement is “continuity” of effort. This, in part, is why Point One of Dr. Deming’s teachings focuses on “constancy of purpose.”

6. In most organizations, 20 percent of employees are change makers, 30 percent are change resisters, and 50 percent are followers. Sustainable quality improvement requires change makers to lead and teach the followers. Don’t waste your energy and time on the resisters. And, by all means, don’t make “quality” an exclusive club that separates you from potential followers. Teach someone about quality and, by your example, show others how quality makes a difference in your own professional and/or personal sphere of influence. The power of teaching and leading by example is enormous. When we teach one other -- together we are 2. When the two of us teach one other – together we are 4. When the 4 of us teach one

other – together we are 8. The power of teaching and practicing quality is exponentially enormous. The satisfaction and rewards are even greater.

- C. Recommended Reading Assignment & Highlights – All selections are from Deming, *The New Economics*.

Chapter 6: Management of People

*“We are living in a prison, under tyranny of the prevailing style of interaction between people, between teams, between divisions. We need to throw overboard our theories and practices of the present, and build afresh. We must throw overboard the idea that competition is a necessary way of life. In place of competition, we need cooperation.”*

*“One is born with intrinsic motivation, self-esteem, dignity, cooperation, curiosity, joy in learning. These attributes are high at the beginning of life, but are gradually crushed by forces of destruction (when) extrinsic motivation (complete resignation to external pressures) gradually replaces intrinsic motivation, self-esteem, dignity... We must replace these forces with management that will restore the power of the individual.”*

*“If they have to pay me a bonus to make sure I do my job, I ought not to have this job in the first place.”*

*“Why is it that someone leaves our company to go to another one contributes more to the new company than he contributed to ours?”*

*“Our schools must preserve and nurture the yearning for learning that everyone is born with.”*

*“Joy in learning comes not so much from what is learned, but from learning.”*

Chapter 10: Lessons in Variation

*Special Note to Students: This week’s chapter includes references to statistics that may confuse or stress students who are unfamiliar or anxious about mathematics. Although you may be uncomfortable or unfamiliar with statistics, I encourage you to read the chapter with emphasis on Dr. Deming’s real life stories about variations and its implications for people’s daily lives both at home and at work*

*“The aim here is to introduce the reader to some easy lessons in variation. Variation is life; life is variation. No two people are alike. Arrival of a train or of an aeroplane varies from day to day. Time en route to work varies day to day, no matter what be the mode of transport ...”*

*“An actuary at the Metropolitan Life Insurance Company was predictably 12 to 17 minutes late every morning. He would on arrival gather everyone around him to explain how it happened, why he was late this morning. Every morning was to him a new morning, never ever a morning like this morning. It never occurred to him that (except for an accident or storm) he was dealing with common causes of variation. It never occurred to him to leave home 20 minutes earlier, to let common causes of variation do their work, and arrive on time. But maybe his life would have been dull if he had arranged it to arrive on time: there would have been no story to tell every morning.”*

*“Dr. Thomas Nolan came one day to talk with me; brought with him a chart that his boy Patrick had made, then age 11... Patrick had kept a record day by day of arrival of the bus that came to carry him off to school, and had plotted the points. He recognized by eyeball special causes of delay on two days. Think what a good start in life Patrick had, understanding common causes and special causes of variation at age 11.”*

D. Additional Resources and Links to Others Sources

Chang, Richard and Niedzwiecki *Continuous Improvement Tools: Volumes 1 and 2* (Richard Chang Associates, 1993)

Evans, James *Statistical Process Control for Quality Improvement: A Training Guide for Learning SPC*. (Prentice Hall, 1991)

Goal QPC, *The Memory Jogger*

E. Questions for Reflection and Discussion

1. One year from now, what will you remember most that you learned in this course?
2. How do you plan to apply what you have learned in this course to your professional or personal life? Be specific.