

Service Quality Research/12

Service Quality Measurement What It Does *Not* Tell Us

By Chuck Chakrapani

One of the strongest points made by Dr. W. Deming in his book *Out of the Crisis* is that, when the underlying causes of variability are not understood, the use of measurements to improve quality is likely to result in poorer quality and lower morale.

The current trend seems to be to measure service quality on an ongoing basis to institute service quality improvement. Yet there is very little evidence of proper analysis of the inherent variability of these measurements. Many organizations will be better off not instituting any measure to improve service quality, since incorrect use of service quality measurement figures will lead to a worsening of the situation. This article discusses why this is so.

Performance Limits

In this last article we saw why a company cannot solve its service quality problem by simply making the employees responsible for their acts. The problem an employee is having could be the result of a number of actors that are not under the direct control of the employee - such as policies, procedures, people and equipment already in place - and may have little to do with factors under his or her control.

Well Meaning Criteria

it is not uncommon for management with a brand-new commitment to quality to declare that:

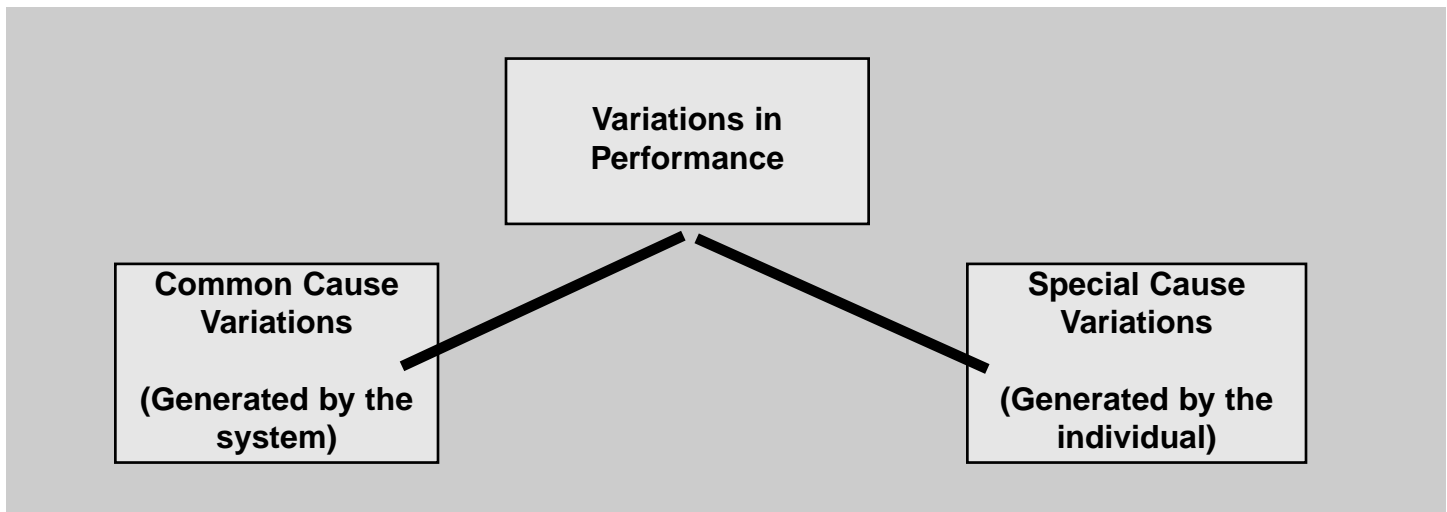
- employees who are 'well below average in performance measures' will be warned or punished
- management will not tolerate more than 10% deviation from specified standards
- management will 'get to the bottom of the problem' in every instance in which an employee performs below specifications to ensure quality service
- management will monitor deviations from specifications and constantly change its procedures with a view to 'fine tuning' its service
- management will assess the performance of different employees (branches, departments) with a view to rewarding those who do the best in meeting service quality criteria.

While such assertions may be well meaning, they lack a basic understanding of how quality is created and maintained. Some of the above procedures, if implemented, can have the exact opposite effect of what is intended. To understand why this is so, we need to understand how variability in performance comes about.

Understanding Variability in Performance

All human behaviour is subject to variability. Even when two competent human beings measure the same length, there will be a difference due to parallax errors. Even if we believe that we get to work at the same time every day, precise recording of time will show that it is never exactly the same time (although the deviation may not be large enough to make any material difference). Such variations are inevitable. Let us call these variations 'common cause variations'. An individual does not have any control over common cause variations. They are inherent in the system.

It is also true that some people are better trained and others are poorly trained; some have experience and some don't. Thus, variations can also occur that can be attributed to the individual directly. These variations can be called 'special cause variations'.



Many organizations concerned with service quality tend not to distinguish between these two types of variations and attribute all variations to the employee. This results in the tendency to 'fine tune' service quality, to punish employees who perform below average, to try to get to the bottom of every 'problem' and other such misguided measures.

Service Quality Fantasies

One of the most destructive ways of using service quality measurement is to treat all variations as due to special causes. I personally believe that this is how measurements are commonly used. Let me illustrate how destructive this can be. For the sake of illustration, let us assume that variations in the examples shown have come solely or mostly from common causes and management has made no statistical calculations to separate the two sources of variations.

Fantasy 1

'We'll Make Employees Fully Responsible For the Results They Produce'

Let us consider the performance of ten employees who are evaluated on criteria related to service quality every week (see chart 1). Lower scores imply better performance. Employees are expected to score 5 or below to be considered satisfactory. When the score is 6 or above the employee is warned. When the score rose to 7 or above the employee was given a severe warning. All other employees were rewarded. All employees receive feedback.

The numbers in chart 1 seem to show that after a quality monitoring programme was put in place, the quality has steadily improved - from an average of 5.1 down to 2.2. Warning the individual employees seems to have been successful.

All employees showed improvement as soon as they were warned. Severe warnings seem to have worked particularly well. Employee C has had an outstanding record; he has exceeded the target every week. He should probably be rewarded. Employee F has the lowest overall score, although she probably needs watching.

When we examine Department II (see Chart 2) we note that it started at about the same level as Department I and progressed steadily until week 3. It started backsliding in week 4 and reached unacceptable levels of performance in week 5.

Unlike employees of Department I, employees here do not necessarily seem to improve their performance after a single warning. Two employees needed two successive warnings before their performance improved. There is no single employee in this department who had a flawless performance record. Perhaps most employees in this department are lazy or incompetent. Maybe the person in charge of this department should be warned as well.

Chart 1. Performance of Department I

| | Week | | | | | Total |
|-------------|------------|------------|------------|------------|------------|-----------|
| | 1 | 2 | 3 | 4 | 5 | |
| A | 5 | 3 | 7s | 4 | 2 | 21 |
| B | 6w | 3 | 3 | 8s | 0 | 20 |
| C | 3 | 5 | 3 | 0 | 5 | 16 |
| D | 6w | 3 | 4 | 3 | 3 | 19 |
| E | 9s | 8s | 2 | 5 | 3 | 27 |
| F | 0 | 2 | 6w | 3 | 2 | 13 |
| G | 6w | 4 | 5 | 5 | 2 | 22 |
| H | 8s | 5 | 0 | 7s | 2 | 22 |
| I | 5 | 8s | 5 | 4 | 1 | 23 |
| J | 3 | 4 | 8s | 5 | 2 | 22 |
| Ave. | 5.1 | 5.4 | 4.3 | 4.4 | 2.2 | 23 |

(W: Employee warned; S: Employee severely warned)

Chart 2. Performance of Department II

| | Week | | | | | Total |
|-------------|------------|------------|------------|------------|------------|-----------|
| | 1 | 2 | 3 | 4 | 5 | |
| A | 3 | 9s | 9s | 0 | 7s | 28 |
| B | 6w | 8S | 6w | 5 | 4 | 29 |
| C | 8S | 2 | 1 | 2 | 6W | 19 |
| D | 6W | 8S | 2 | 6W | 9S | 31 |
| E | 7S | 5 | 5 | 2 | 6W | 25 |
| F | 1 | 1 | 7S | 6W | 9S | 24 |
| G | 2 | 2 | 1 | 8S | 2 | 15 |
| H | 6W | 1 | 3 | 8S | 9S | 27 |
| I | 6W | 2 | 4 | 1 | 3 | 16 |
| J | 7S | 8S | 4 | 8S | 7S | 34 |
| Ave. | 5.2 | 4.6 | 4.2 | 4.6 | 6.2 | 25 |

Probably most people will agree that the performance of Department II employees is inferior to that of Department I. Further while Department I has shown consistent improvement, Department II has failed to retain the gains it made and in fact it had backslide. Again probably few will question the use and interpretation of the research figures.

The Importance of Common Cause Variations

Although many patterns seem to emerge from the service quality measurements presented above, in reality, they have nothing to do with the performance of individual employees at all. In fact, the numbers in the tables are random numbers taken from a book on statistics. (I want to emphasize that the above illustration is not made up of selective random numbers. You can choose any set of random numbers and arrive at patterns that appear meaningful. Dr. Deming illustrates the point very effectively in his seminars through his famous 'red beads experiment'. (For an explanation of 'red beads experiment see *Out of the Crisis* by Deming.)

In any situation over which an employee has no control - such as the number of phone calls he or she needs to handle, the complexity of customer queries, lunch hour rush, availability of shared computer terminals - there will be 'common cause' variations. They are generated by the system currently in place. These variations may appear to have identifiable patterns (as in the charts above - we identified an employee with an outstanding record and a department whose performance is poor) although they are purely random variations.

The biggest mistake in the use of service quality measurements is to assume that all variations are due to 'special causes' ie. factors under the control of an employee, a branch or a department.

When common cause variations are larger than special cause variations (which is often the case in stable systems), rewarding or punishing an employee on the basis of raw measurement numbers is no better than consulting a table of random numbers to measure performance. In fact, it is a lot worse since both management and employees believe it to be a meaningful measure and take actions which will have no positive effect on the system.

Fantasy 2

"We'll Allow 10% Variation From the Standard, But No More"

This is a meagre acknowledgement of the fact that not all deviations from the standard is the employees' fault. By specifying a range (such as 10% deviation from the standard), management hopes to remove variations due to common causes.

But setting such arbitrary standards is meaningless. Each system has a different degree of variability. Some systems may have common cause variations of just 5%. Allowing 10% in such cases will mask special cause variations which may need to be identified, if quality measures are to be implemented. Other systems may have a common cause variability of 20%. Allowing 10% in such cases will produce the same results as Fantasy 1 described earlier.

If limits to variations are to be set, they should be based on proper statistical calculations and not on criteria that 'appear reasonable'.

Fantasy 3

"We'll Fine Tune Our Service Quality by Constant Adjustment"

When variations occur due to common causes, they will vary from the target set by management. Those variations are likely to be around the mean and would be predictable. If management tries to eliminate such variations, it is indeed akin to changing the mean of the distribution.

Because common cause variations are distributed around the mean, the ill-advised 'fine tuning' will indeed make the situation worse, not better. *"If anyone adjusts a stable process to try to compensate for a result that is undesirable, or for a result that is extra good, the output that follows will be worse than if he had left the process alone"* (W.E. Deming, *Out of the Crisis*, p. 327. Discussion on pages 327-329 demonstrates this principle through a Monte Carlo experiment).

Again such tampering is the result of treating all variations as the result of special causes, something that can be controlled by acting on parts of the system without changing the system that gives rise to such variations.

Fantasy 4

"We'll Reward Top Performers and Punish the Bottom Ones"

Service quality measurements are often used to reward people who excel and punish those who lag behind. It is not uncommon for an organization to reward the top 10% of its employees (or warn the bottom 10%) based on service quality measurements.

If all or most variations are produced by common causes, then the top 10% will be a random group of employees; so will the bottom 10%. To see it from another perspective, even if every one of the employees is outstanding, half of them will be 'below average'; 10% of them will be at the bottom 10% in performance. This may have nothing to do with their performance. It is a mathematical artifact.

The Significance of Variability

1. Human performance will always show variability, from person to person and from occasion to occasion in the same person.
2. Some of these variations are part of the system within which a person operates. An employee's performance will vary depending on the type of customer he or she meets, their requirements, the equipment he or she uses and the like. These are called common cause variations. By and large, an employee has no control over these factors.
3. Some variations are due to the employee himself or herself. For instance, an employee may lack the skills required to do the job or may have received inadequate training. Variations that arise due to such factors are called special cause variations.
4. Variations due to these two sources need to be identified so that:
 - i. common cause variations can be brought down by improving the system; and
 - ii. special cause variations can be brought down by providing assistance to the employees who generate them.
5. Common cause variations can be statistically calculated for each process. They should be decreed to be some arbitrary figure.

What is the Solution?

We can define quality enhancement as a two step process. One, we should reduce variability in service - consistency and reliability should be built into any service aspect. Inconsistent service is not consistent with quality. Two, we should achieve a higher level of service. The first aspect requires understanding of the nature of variability and the second aspect has more to do with innovation, vision, proactive research and a search for constant improvement.

Our discussion centred on the theme that a great deal of variation found in any organization can be attributed to common causes or to the system itself. It follows that exhorting employees to work harder or smarter to provide quality is not likely to improve quality - although it can make it worse. If common causes are the source of much of the variation what is management to do?

- The first priority of management bent on consistent service is to identify how much of the variation can be attributed to common causes and how much to special causes. (This can be accomplished by the use of simple statistical formulas).
- If the system is in a stable state (ie. most employees are within control limits), it means that inconsistent performance leading to poor quality is the result of common causes and is a part of the system currently in place. Quality cannot be improved by an action that transfers the responsibility for service quality to the employees. Slogans, exhortations, rewards and punishments may give an illusion of progress but they will have no effect on common cause variation.
- Only management can improve quality. Management can act to change the system.

Current management thinking, Deming contends, is based on transferring the responsibility for quality from management (where it belongs) to workers (where it does not belong). Everyone doing his or her best will not result in superior service quality, simply because most workers are already doing what they believe to be their best. Unless the difference between common and special causes is understood and attempts are made by management to reduce common cause variations, it is unrealistic to expect any improvement in service quality.