What is the Law of Variation?

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In simple yet profound terms, variation represents the difference between an ideal and an actual situation.

An ideal represents a standard of perfection—the highest standard of excellence[1]—that is uniquely defined by stakeholders, including direct customers, internal customers, suppliers, society and shareholders. Excellence is synonymous with quality, and excellent quality results from doing the right things, in the right way.

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

According to the law of variation as defined in the *Statistical Quality Control Handbook:*

- "Everything varies." In other words, no two things are exactly alike.
- "Groups of things from a constant system of causes tend to be predictable." We can't predict the behavior or characteristics of any one thing. Predictions only become possible for groups of things where patterns can be observed.[2]

If outcomes from systems can be predicted, then it follows that they can be anticipated and managed.

Managing Variation

In 1924, Dr. Walter Shewhart of Bell Telephone Laboratories developed the new paradigm for managing variation. As part of this paradigm, he identified two causes of variation:

- Common cause, or noise, variation is inherent in a process over time. It affects every outcome of the process and everyone working in the process. Managing common cause variation thus requires improvements to the process.
- Special cause, or signal, variation arises because of unusual circumstances and is not an inherent part of a process. Managing this kind of variation involves locating and removing the unusual or special cause.

Shewhart further distinguished two types of mistakes that are possible in managing variation: treating a common cause as special and treating a special cause as common. Later, W. Edwards Deming estimated that a lack of an understanding of variation resulted in situations where 95% of management actions result in no improvement.[3] Referred to as tampering, action taken to compensate for variation within the control limits of a stable system increases, rather than decreases, variation.

References

1. Matthew E. May presents this definition for perfection in *The Elegant Solution: Toyota's Formula for Mastering Innovation* (New York: Free Press, 35).
2. Western Electric Company, *Statistical Quality Control Handbook,* 2nd ed. (AT&T Technologies, 1984) p. 6-7.
3. W. Edwards Deming, *The New Economics for Industry, Government, Education* (Cambridge, MA: Massachusetts Institute of Technology, Center for Advanced Engineering Study, 1993) p.38.

Based on Timothy J. Clark, *Success Through Quality: Support Guide for the Journey to Continuous Improvement*, ASQ Quality Press, 1999.