Putting Best Practices to Work

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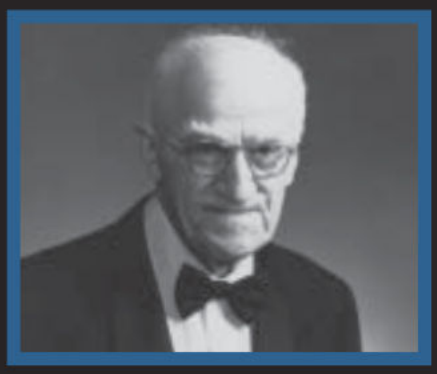

Joseph M. Juran

1904-2008

A tribute to his life and work p. 20

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Medium or Median?

Q: Please let me know which of the following is correct and why: medium probability of failure or median probability of failure?

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A: Either of these two terms can be correct. Let us consider an example. There are N different brands of a product. Probabilities of failure are known for each of the brands. The data set in Table 1 shows that column one contains the row numbers. Column two contains the product brand names, and column three contains the respective probabilities of failure. In the example, $N = 10$.

We sort this data set (which can be easily done in Microsoft Excel) in ascending order of the probability of failure (Table 2).

Now we can say that the product brands in the second third of the sorted data set (approximately, when N is not a multiple of 3), in medium blue, have medium probability of failure. The product brands in the first third of the data set (shaded light blue) sorted in ascending order can be said to have low probability of failure, and the product brands in the last third of the data set (dark blue) can be said to have high probability of failure. From this example, it is clear that the term medium probability of failure is a qualitative (or categorical) characteristic of the probability.

We can also estimate the median probability of failure as a quantitative characteristic of the set of probabilities of failure. The median divides the sorted data set so that half of it is located above it and another half is located below it.

With odd N, the median is approximately equal to the value in the middle of the data set (in a row numbered $(N – 1)/2 + 1$). For example, for $N = 9$, the value in the fifth row of the data set approximates the median. With even N, the median approximately equals the mean of the two values in the middle of the data set (located in the rows numbered $N/2$ and $N/2 + 1$). In our example, $N = 10$, and the median approximately equals the mean of the fifth and sixth values in the sorted data set, which is $(0.04 + 0.05)/2 = 0.045$.

The example shows that there is a single median value of the probability of failure, and there can be several values of the probability of failure in the medium category.

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Sample data set / TABLE 1

N	Product brand	Probability of failure
1	Brand 1	0.05
2	Brand 2	0.06
3	Brand 3	0.04
4	Brand 4	0.03
5	Brand 5	0.02
6	Brand 6	0.07
7	Brand 7	0.04
8	Brand 8	0.09
9	Brand 9	0.07
10	Brand 10	0.01

Data sorted by probability of failure / TABLE 2

N	Product brand	Probability of failure	Category
1	Brand 10	0.01	Low probability of failure
2	Brand 5	0.02	
3	Brand 4	0.03	
4	Brand 3	0.04	Medium probability of failure
5	Brand 7	0.04	
6	Brand 1	0.05	
7	Brand 2	0.06	
8	Brand 6	0.07	High probability of failure
9	Brand 9	0.07	
10	Brand 8	0.09	

ISO 14001 and PDCA

Q: What is ISO 14001? What is the plan-do-check-act (PDCA) cycle for it?

A: ISO 14001 is a certification standard for environmental management systems developed and published by the International Organization for Standardization (ISO). ISO is a worldwide federation of standards bodies who work together to prepare standards with international applicability.

The date following the standard designation is the current revision date. ISO 14001 was first published in 1996 (ISO 14001:1996). ISO reviews its standards every five years.

In 2001, the decision was made to make nonsubstantive changes to ISO 14001:1996 to bring the standard into closer compatibility with the ISO 9000 series of standards. This revision process resulted in a second edition of ISO 14001 in 2004.

The PDCA approach is a process by which results are obtained by:

1. Determining the objectives and processes needed to meet the requirements of the organization's environmental policy (plan)
2. Implementing those processes (do).
3. Monitoring and measuring the processes against the requirements of the organization's EMS (check).
4. Taking any actions necessary to correct deficiencies and improve the EMS (act).

This question might also be asking

about the length of time for an organization to complete a cycle of PDCA. ISO 14001 does not prescribe a definite time period. The standard requires that a management review, which completes a cycle and starts a new cycle, be conducted at planned intervals. A typical timeframe is annual review.

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Deming's legacy

Q: Who was W. Edwards Deming, and how does his work contribute to quality as we know it today?

A: Even though most of Deming's contributions in this country occurred 20 to 30 years ago, his message seems increasingly relevant today, given an American economy struggling to maintain a foothold in a highly competitive, global marketplace.

Deming warned American management that to survive and thrive, it needed to adopt a dramatically new style of leadership—one primarily driven by a continual quest for quality of product, improvement of process and high level of customer satisfaction. Deming explained that higher quality led to huge competitive advantage: a larger customer base, increased revenue and a reduction of waste and wasteful costs. Organizations lacking quality and its advantages would slowly wither on the vine. So, Deming said, it didn't really matter whether management listened to him or not. In the end, quality would prevail.

Today's managers need not look far

W. Edwards Deming

to see just how relevant Deming's simple truths are: Detroit continues its decades of wrestling with Asian competitors; legacy airlines are successfully challenged by new upstarts offering better service at a lower cost; American healthcare has become the world's most expensive while producing staggering levels of deadly medical errors; and the country is spending more and more on education, only to see the world ranking of its students continue to decline.

Deming added rich texture to his philosophy with scores of parables and nuggets of wisdom, easily understood by manager and worker alike:

- "Paper profits do not make bread."
- "Measurements of productivity do not lead to productivity."
- "Drive out fear so that everyone may work effectively for the company."
- "A good manager knows 55 ways to meet his allowance for inventory shrinkage, all of which hurt the business."
- "When responsibility is divided, no one is responsible."

Deming's insight earned him much praise in his day. He took medals from President Reagan, Emperor Hirohito and the National Academy of Sciences. He was awarded well over a dozen honorary degrees, including one from Harvard. A 1991 *U.S. News and World Report* cover story proclaimed Deming's wisdom one of "nine hidden turning points in human history." And Deming's portrait still hangs in the lobby of Toyota's main office.

Yet Deming lived a modest life. He drove a well-worn Ford Maverick, and his business card titled him merely a "consultant in statistical studies." Monetary reward was of secondary concern; more than once, General Motors had to insist that he tend to the invoicing of his services. Instead, Deming saw his mission as servant leadership. He took most of his reward intrinsically, from guiding others toward a better organization and a better world.

Deming's insights, as well as his personal model of motivation and leadership, remain highly effective guidance for American managers and leaders seeking, as Deming so often described it, to not "dig deeper the hole we are already in."

FOR MORE INFORMATION:

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Dobyns, Lloyd and Claire Crawford-Mason, *Thinking About Quality: Progress, Wisdom, and the Deming Philosophy*, 1994.

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AN EXPERT'S OPINION

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