

## Six Sigma for the Mathematically Challenged

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Inc.com • 2007

*Don't worry if you don't know statistics and probability. We have a process by which you can help employees minimize mistakes and reach your business's goals without a degree in mathematics.*

Motorola and General Electric have ingrained Six Sigma into how they think and behave, and each attributes a significant part of its success to that methodology. The obvious question: Can Six Sigma benefit smaller businesses as well?

Let's start at the beginning: First, what is Six Sigma, and second, why the weird name?

The Six Sigma process is a laser-like approach, well-grounded in mathematics and statistics, to reducing variation in process output. Because controlling variation is integral to controlling quality and costs, the Six Sigma process can be constructive within most businesses. Used inappropriately, however, it can be a resource hog that misdirects attention within the organization.

The name Six Sigma comes from statistics. "Six" is simply the number between five and seven, and "Sigma" is a statistical term for an amount of variation from an expectation. Sidestepping a detailed discussion of probability theory, Z-scores and calculus, Six Sigma accepts that the output of a process can be measured and when that process is in statistical control, we can predict the range of output values of that process quite well. Specifically a Six Sigma process would produce no more than 3.4 defects (process outputs outside the expected range) per million opportunities.

Here's an example to part the clouds. Let's say that we own a business packaging sugar for table-top restaurant use. We want to control the amount that goes into each packet very carefully, to both limit costs of overfilling and to limit the chances of violating the label quantity by under filling.

Our initial process for filling packets could be an employee shoveling sugar from a 55 gallon drum, trying to pour the right amount into each packet. No matter how conscientious the employee, this process is unlikely to put the targeted amount into each individual packet. Because of that process variability, the only way to promise customers that the packets they receive from us contain the

labeled amount is to weigh each individual packet – a slow and costly proposition.

It is our process, not our employee, that bears the blame for that. For employee satisfaction, customer service and for cost control, we must improve our filling process. Six Sigma is a methodology for doing just that, leading to a predictable process that allows less than 3.4 defects per million opportunities (3 to 4 over/under weight packets of sugar in every million we fill). That's pretty good aim.

Let's turn from the quantitative implications of Six Sigma to its thought process. The acronym DMAIC, widely applicable, logical, and improved by practice, represents the following: Define, Measure, Analyze, Improve and Control. Even ignoring Six Sigma math, DMAIC can help employees connect business results to something over which they have control or influence, and work to ensure their impact is positive.

An example: Let's say a company goal is to improve safety. It can be both easy and effective to ask groups of employees to work together to improve safety in their workplace behaviors, and to define and display that effort. Here is how DMAIC would be applied to this goal.

**DEFINE:** Identify something within your control that you can do to help reach the goal.

- Most near-miss injuries in our area are a result of inappropriate use of Personal Protective Equipment (PPE). We will focus on workers in our area using PPE correctly at all times.

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**MEASURE:** Identify data collection plan to assess performance.

- Each day we will check at shift start-up and return from breaks and lunch if each of us has on the proper PPE; each occurrence of inappropriate PPE will count as an “unacceptable event.” We will write the number in red on our calendar.

**ANALYZE:** Examine the data for useful information.

- In reviewing the data, we notice that Mondays score the worst, and days with temporary employees also score poorly.

**IMPROVE:** Identify ways you can improve performance by solving problems.

- We are going to post a picture of a person by the time clock and draw the PPE required in our area on the person. On Mondays we’ll meet at the time clock before walking to our area. We will ask HR to review the drawing with any employees transferred to our area.

**CONTROL:** Institutionalize the improvements so they don’t go away.

- We will bring in cake to celebrate every month that we have no violations.

Your company may be math-challenged and the thought of doing anything with statistics may put you to sleep, but don’t throw out the baby with the bathwater. Through the Six Sigma DMAIC thought process, you can involve employees in reaching company goals. Whether expenses, mistakes, or something else of importance to the business, employees can contribute when we show them how.



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