Shainin® | The Red X® Company

Shainin and Six Sigma

We are often asked to describe the difference between Shainin and Six Sigma. That question is more complicated than it appears. Shainin has developed standalone programs to help our clients achieve their Six Sigma goals. In other instances, Shainin technology has greatly enhanced existing Six Sigma programs.

Successful business performance improvement programs share common traits. They are customer focused. They require active engagement of senior leadership. Results are achieved project-by-project. Projects are data driven. And ultimately the program results in a change to the company's culture regarding customer quality, problem solving and problem prevention. Shainin has developed some unique tools for selecting the most effective projects, managing those projects to rapid conclusion, and driving cultural change. However, these elements are features of all successful business performance improvement programs.

The key differences are in the role of statistical analysis and in project planning and execution. Most Six Sigma programs feature weeks of training in statistics. Students are taught to understand descriptive statistics. They learn to apply regression analysis, designed experiments, hypothesis tests, analysis of variance (ANOVA) and control charts. Students are often taught facilitation skills to support brainstorming and fishbone diagrams. Projects usually start with a meeting of subject matter experts to produce a list of possible causes. This often leads to large experiments to sort through the possible causes. Project success depends on the true root cause being on the list. Therefore, teams select more possible causes rather than fewer. This is a divergent approach often generating a number of parallel activities. Statistical analysis drives a preference for calculated results from the assessment of large data sets. This makes the application of statistical software, e.g., Minitab® essential.

The underlining principle of statistical problem solving is $Y = f(x)$. This drives teams to identify all factors that can possibly influence the value of the key output (Y). The expansion of this equation is $Y = a + bx_1 + cx_2 + dx_3 + \ldots + mx_n$. A successful project will find all coefficients (a, b, c, d, etc.) that are statistically significant. The DMAIC (Define, Measure, Analyze, Improve, and Control) process supports this approach.

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DEFINE	MEASURE	ANALYZE	IMPROVE	CONTROL
▪ Who customers are, what their requirements are for products and services, and what their expectations are. ▪ Project boundaries, the stop and start of the process. ▪ The process to be improved by mapping the process flow.	▪ Develop a data collection plan for the process. ▪ Collect data from many sources to determine types of defects and metrics. ▪ Compare to customer survey results to determine shortfall.	▪ Identify gaps between current performance and goal performance. ▪ Prioritize opportunities to improve. ▪ Identify sources of variation.	▪ Create innovate solutions using technology and discipline. ▪ Develop and deploy implementation plan.	▪ Prevent reverting back to the "old way." ▪ Require the development, documentation and implementation of an ongoing monitoring plan. ▪ Institutionalize the improvements through the medications of systems and structures (staffing, training and incentives).

Shainin projects are evidence based; converging on the largest source of variation, the Red X. For a Shainin project, the underlining principle is $DY = f(Dx)$. The expansion of this equation is $DY = a + bDx_1 + cDx_2 + dDx_3 + \ldots + mDx_n$. By focusing on variation, i.e., the change in Y, the goal becomes the discovery of the term with the largest value. The largest value will result from a combination of a significant coefficient and a large change in X. This term is seldom the term with the largest coefficient. The Pareto principle requires a substantial difference in the contribution in these terms to the change in Y. The goal of a Shainin investigation is to rapidly converge on the critical few terms contributing most of the variation. In many projects, the Red X is an interaction among independent inputs (Xs). Shainin tools are highly effective in revealing these interactions.

Shainin projects feature the discovery of critical relationships through rigorous detective work. Shainin talks to the parts and discovers the Red X by taking advantage of performance differences between the best and worst parts. Rather than ask subject matter experts to list possible causes, Shainin uses their insights to develop a strategy to force the parts to reveal their differences. The Shainin problem solving roadmap is FACTUAL™ (Focus, Approach, Converge, Test, Understand, Apply, Leverage).

 FOCUS	 APPROACH	 CONVERGE	 TEST	 UNDERSTAND	 APPLY	 LEVERAGE
▪ Multiple Metrics Leveraged and Project Impacted ▪ Project Definition ▪ Staffing Matrix Complete	▪ Green Y Description ▪ Strategy Selected and Best Contrast(s) Leveraged ▪ Measurement System Verified	▪ Converging on the Red X ▪ Red X Candidate Identified	▪ Risk Assessed and Type of Confirmation Experiment Applied ▪ Red X Confirmed	▪ Green Y to Red X Relationship Understood and if Appropriate Tolerance Limits Established	▪ Corrective Action Implemented and Verified ▪ Corrective Action Proceduralized ▪ Project Duration ▪ Project Benefits and Cost Savings	▪ Read Across Implemented and Additional Savings Calculated ▪ Lessons Learned

The Approach step is one key difference between FACTUAL and DMAIC. During Approach the engineer develops a discovery strategy based upon the nature of the problem and the availability of BOB and WOW parts. The execution of this strategy allows the engineer to rapidly converge on the key inputs through a process of elimination. Although Shainin techniques are statistically rigorous, graphical analysis keeps the statistics in the background and encourages engineering insight into critical relationships. Shainin's emphasis on insightful graphical analysis supplants most statistical calculations. Shainin tools are simple enough to be used properly by shop floor operators, yet sophisticated enough to solve highly, complex problems in manufacturing quality, product performance and product reliability.

The Test phase of FACTUAL is another key difference from DMAIC. During the Test phase, teams are required to demonstrate an understanding of the root cause by turning the problem on and off. We often refer to this step as taking the Red X to court. The Approach and Converge phases represent detective work, the Test phase represents proving guilt beyond a reasonable doubt. The Test phase protects companies from investing in solutions for the wrong root cause. In those instances where the test fails to confirm the Red X, the team returns to the Approach and Converge phases to find the missing contributors.

Following a Y → X convergent approach allows Shainin to find the Red X quickly and efficiently. By leveraging differences, Shainin minimizes the time, number of parts, people and precious resources required to get to the true root cause every time. Shainin investigations have a rich history of solving problems that were thought to be unsolvable, by discovering surprising relationships that never came up in brainstorming sessions with subject matter experts.

The Shainin technology is often favored by engineers who are comfortable with understanding how things work and appreciate the discovery of unexpected relationships. DMIAC techniques are favored by mathematicians who are more comfortable with calculations and who seek complete models of cause effect relationships.