

Overlooked requirements, long delays, lost opportunities

The main reason cited for long product development cycle times, and redesigns required after launch, is the discovery of 'new' customer requirements late in the program. Yet analysis shows that the 'new' requirements weren't really new, they existed all along. The team merely 'missed' the requirement, or it was lost in the 'hand-off' between marketing, research and development, design development and process design and roll out.

Integrated Road Map Approach to Design: Define, Concept, Design, Optimize, Verify

The Uniworld DFSS approach ensures that the true customer requirements are understood and deployed throughout the organization. The first week of training is attended by both customer facing and technical participants, to enable the cross-functional team to understand the true customer requirements and environment before creating concepts. This allows the team to minimize the potential for missed requirements and miscommunication through out the project. In the following weeks of DFSS training, the technical team uses statistical tools to identify, design, optimize and verify the critical deployed parameters.

The **Define** stage outlines the dimensions of value and quality, identifies the potential internal and external customers, the existing opportunities and gaps, and initiates the team in outlining the customer's compelling reason to use or choose the new design. Charters are outlined with deliverables, teams are selected, and project timing is identified.

In the **Concept** stage, the team conducts visits to understand the customers' environment and captures images and voices to identify true customer requirements. Requirements are deployed down from Customer to system, subsystem, process and operations. Structured innovation occurs against real customer, functional and technical requirements. Concept selection allows the team to benchmark the new designs against competing alternatives. The selected concept is then designed.

The **Design** stage starts with refining the design for function, manufacturability and assembly. Quantitative analysis with statistical tools guide the team to creating and allocating requirements and tolerances based on performance variation analysis of similar products and processes. The team characterizes the design, outlining the critical parameter flow down, capturing performance data on score cards, and passively observing and conducting comparisons. The characterization is completed with simple experiments enabling the team to determine the functional relationship between the performance, design and process, identifying the key $Y = f(x)$ relationships.

Optimization recognizes that merely understanding $y=f(x)$ is not enough. The requirements must produce results robust to environmental noise and process variation, at minimal cost. The teams further refine the specifications and design, ensuring smooth ramp-up and launch.

Verification of the critical parameters performance, capability and reliability is accomplished in the last phase, allowing the team to predict the performance before full volume launch.

Proven Results:

With the DCDOV process, your team creates a successfully launched new product, delivering true value to the customer, growing the top line of the business. The design has been created in conjunction with a smoothly launched internal manufacturing process, minimizing the bottom line. This integrated approach to Design produces proven results.

Design for Six Sigma
Technical Product and Process

Length	20–25 days Class room over 4–5 months 6–9 months one-on-one project Coaching
Key Participants	*Marketing , Service, Sales, Customer Contact* Research and Development Product Engineering, Test Engineering, Manufacturing, Tooling, Process Designers and implementers
* 1st week	
Requirements	Approved Project, Minitab 14 on laptop for weeks 2+
<ul style="list-style-type: none"> • Key Learning Outcomes: At the end of class, participants will be able to: • Identify Key Internal and External Customers, Stakeholders and Influencers • Identify and prioritize dimensions of value, quality, perceived gaps • Capture and Translate Customer Voices and Images into True Customer Requirements • Identify Gap areas in expectations, performance, and satisfaction • Create a multitude of innovative value enhancing concepts in a structured manner • Select key concepts to design and develop in detail • Create a compelling reason for customer to use or choose new offering • Deploy Customer Requirements into Technical Functions and Requirements, prioritize same • Identify the linkage between the critical inputs and performance outputs, map and capture performance improvement • Identify, prioritize and minimize risk • Identify the impact of the measurement system variation • Allocate requirements and tolerances based upon variation and cost • Refine design for assembly and manufacturability • Passively observe and then apply statistical analysis to determine the relationships between inputs (x) and outputs (y) • Conduct statistical experiments to identify and then optimize the functional relationships $y=f(x)$ • Predict and then Verify performance, reliability and capability of design prior to launch • Validate and Control critical parameters after launch • Explain and apply the applicable DMAIC statistical concepts and tools 	
Fifth week options: Key learning outcomes:	<ul style="list-style-type: none"> • Conduct and analyze advanced design of experiments • Optimize for multiple responses • Conduct and analyze mixture DOE • Conduct and optimize service and maintenance reliability
Certification:	Successful: <ul style="list-style-type: none"> • Completion of course work, phased exams, Final exam • Demonstration of knowledge and application of key tools • Project completion and defense Next project started