

# Problem Solving X.0

## Next Generation of Problem Solving

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Shainin Red X Master  
Design Thinking Coach

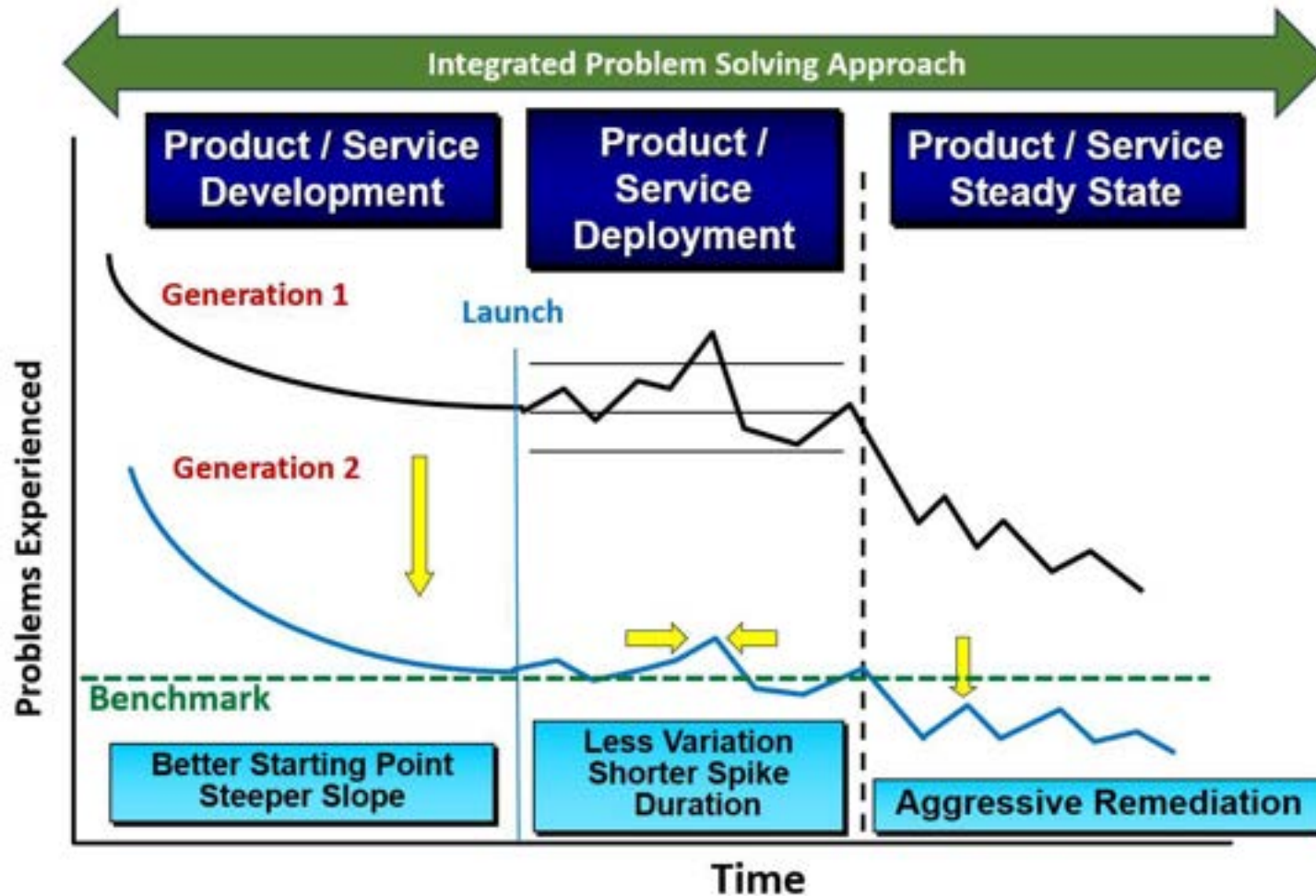


# Agenda




- Background / Quality Principles
- Overview of Current Problem Solving Methodologies / Frameworks
- Journey to Problem Solving X.0
- Problem Solving X.0 Framework and Tools
- Problem Solving X.0 Application Case Studies
- Problem Solving X.0 Summary
- How Can You Get Engaged with 'Integrated Problem Solving Approach' Movement
- Q&A

# Background / Quality Principles

# Quality Principle – Juran Trilogy



# Balance of Quality Approaches Is Critical For Organizational Excellence

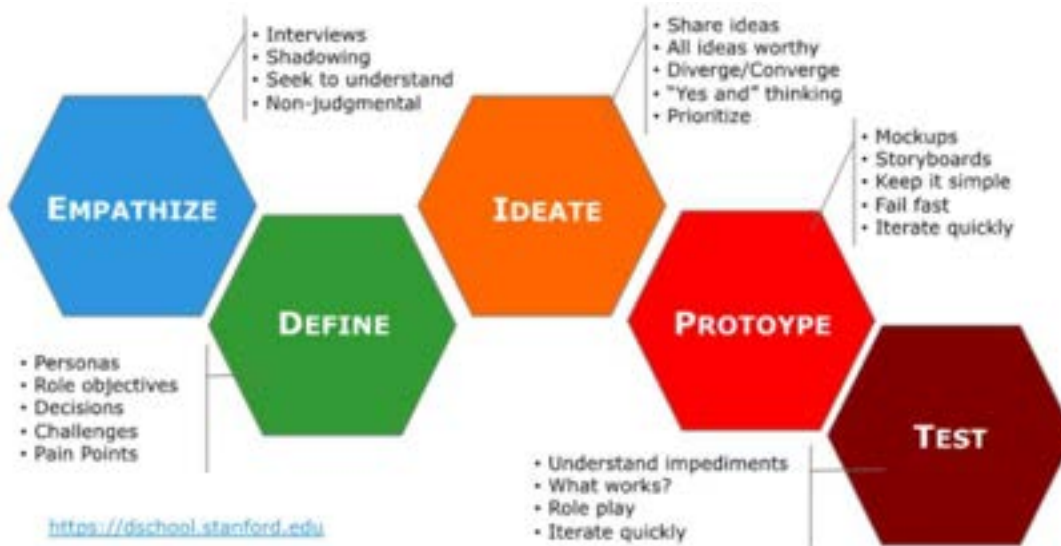
| Quality Approach                                                                                                                      | Illustration                                                                        | Key Points                                                                                                                                                                                                                                                            | Key Enablers                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Reactive Quality</b><br/>(Fire Fighting)</p> <p>Organizations that are always putting out fires will eventually get burned.</p> |    | <ul style="list-style-type: none"> <li>• Low Leverage</li> <li>• High Visibility</li> <li>• High Cost</li> <li>• Customer Dissatisfaction</li> <li>• Easiest to Measure Performance</li> </ul>                                                                        | <ul style="list-style-type: none"> <li>• Structured Problem Solving                             <ul style="list-style-type: none"> <li>• 8D / QC 12 steps</li> <li>• PDCA / PDSA</li> <li>• Kepner-Tregoe</li> <li>• Lean Six Sigma</li> <li>• Shainin Red X</li> </ul> </li> <li>• Standard Work</li> </ul> |
| <p><b>Proactive Quality</b><br/>(Fire Prevention)</p>                                                                                 |    | <ul style="list-style-type: none"> <li>• High Leverage</li> <li>• Low Visibility</li> <li>• Low Cost</li> <li>• Customer Enthusiasm</li> <li>• Difficult to Measure Performance</li> </ul>                                                                            | <ul style="list-style-type: none"> <li>• Kaizen</li> <li>• APQP</li> <li>• Design for Six Sigma</li> <li>• DFMEA / PFMEA</li> <li>• Innovation / Design Thinking</li> </ul>                                                                                                                                  |
| <p><b>Predictive Quality</b><br/>(Fire Prediction)</p>                                                                                |  | <ul style="list-style-type: none"> <li>• Data-driven insights accelerate discovery of issues and risks</li> <li>• Faster and more confident decisions</li> <li>• Better understanding of customer</li> <li>• Faster and more confident real-time decisions</li> </ul> | <ul style="list-style-type: none"> <li>• Integrated Big Data</li> <li>• Data Analytics</li> <li>• Artificial Intelligence (AI)</li> <li>• Machine Learning</li> </ul>                                                                                                                                        |

# Overview of Current Problem Solving Methodologies / Frameworks

# Design Thinking - Stanford

## Overview:

Human-centered approach to explore and address problems we don't fully understand from a customer perspective.



## Key Strengths:

- Focused on connecting with **user** (customer) at the **deeper feelings level** to understand their true needs to make sure that the right problem is being solved
- Drives solutions that are outside the box
- Focus on **failing fast and failing forward** in optimizing the solution rather than spending tremendous effort and resources to come up with a perfect solution that may not work

## Design for Six Sigma (DFSS)

### Overview:

DFSS is a structured method to develop product designs, Optimize and Verify functional performance based on Voice of the Customer.

### Key Strengths:

- Provides a structure to the design process, anticipates **problems to avoid** them.
- Focus on product / process **robustness** which makes it insensitive to the sources of variation. This improves product quality, reliability and durability and minimizes design changes
- Product development process is a crucial activity since this is when most downstream production and quality problems are locked-in.

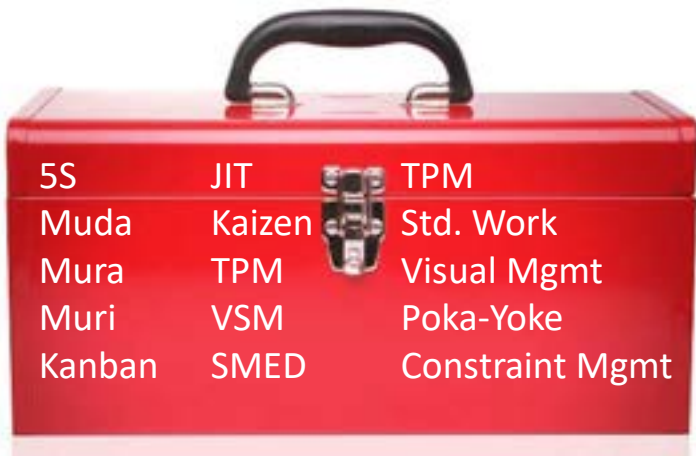




# Lean

## Overview:

Lean is a way of thinking about creating customer value with fewer resources and less waste.



## Key Strengths:

- Flexibility to utilize individual tools as there is no structured framework to follow
- **Engages employees on line** and drives ownership of improvement for every employee
- Results / Benefits are usually **easy to measure**
- Improvements can be made in a **short-time**

## Six Sigma

### Overview:

Six Sigma is a methodology that decreases process variation that helps lead to defect reduction and improvement in profits, employee morale, and quality of products or services.



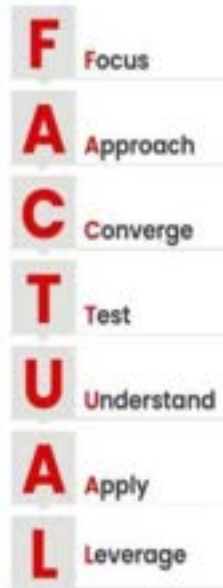
### Key Strengths:

- **Broad application** - manufacturing, engineering, administrative & transactional activities
- Very formal process of Project Definition including Team Charter
- Emphasis on process mapping and identifying important variables for each step of the process - **systems approach**
- Passionate commitment not optional at every level of leadership - not delegated to lower level
- **Required project reviews** by every team during every phase of training
- Availability of reference material - many web sites, books, articles
- Structure in place at the companies to **reward teams** and sponsors for the successes

# Shainin Red X

## Overview:

A problem-solving system designed to leverage contrast between Best of Best (BOB) and Worst of Worst (WOW). It has been mostly applied in manufacturing facilities.



<https://asq.org/quality-resources/shainin-system>



## Key Strengths:

- Techniques **easy to understand and implement** - don't involve theoretical statistical knowledge
- Emphasis on right strategy selection and understanding the physics
- Emphasis on learning as much as possible with **as few as possible parts**
- Clue generation process narrows Red X candidates to one or two items.
- **Focuses on killing Red X and not trying to fix everything** so requires less resources and easy to implement the solution

## Current State: Many Siloed Problem Solving Methodologies



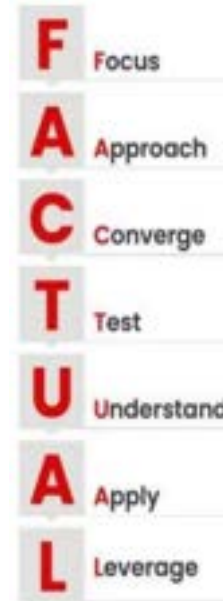
Design Thinking



Design for Six Sigma



Lean



Shainin Red X



Six Sigma

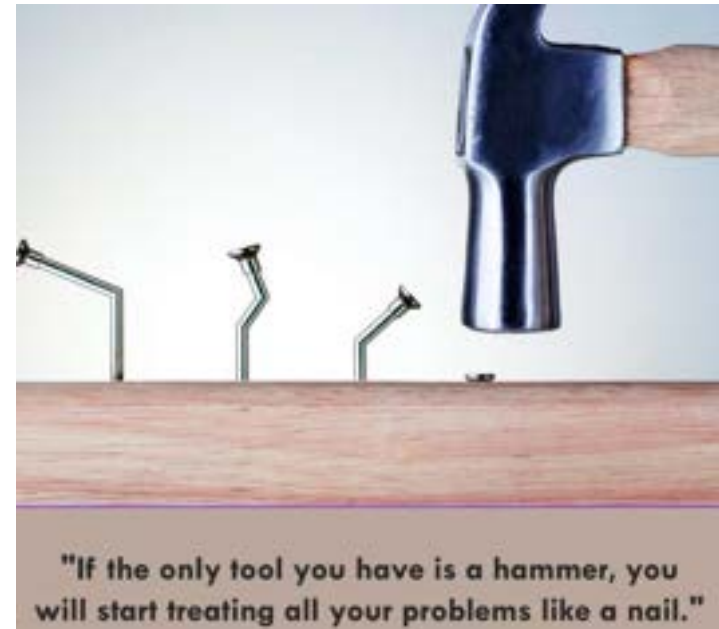
Consultants and Trainers benefit



Problem solvers are often confused about what is the right methodology to follow for problem solving

## Issues with Current Siloed Problem Solving Frameworks

- Problem solving processes have distinct frameworks with its own set of mostly unique techniques that are specified in that particular framework for the practitioners to follow
- Consultants / Trainers emphasize that their framework is the only way to solve problems and all other methodologies / tools should not be used
- Organizational top leadership gets confused about which is the best methodology for problem solving
- Most organizations develop expertise and promote certifications in one or two specific techniques and are missing out on the integrated approach to problem solving that is most effective and efficient



# Journey to Problem Solving X.0



## Development of Problem Solving X.0

- Over 30+ years, I gained deep knowledge all the different problem solving methodologies and achieved the highest level of certifications:

- Shainin Red X Master
- Design for Six Sigma Master
- Six Sigma Master
- Operational Excellence Master
- Design Thinking Coach

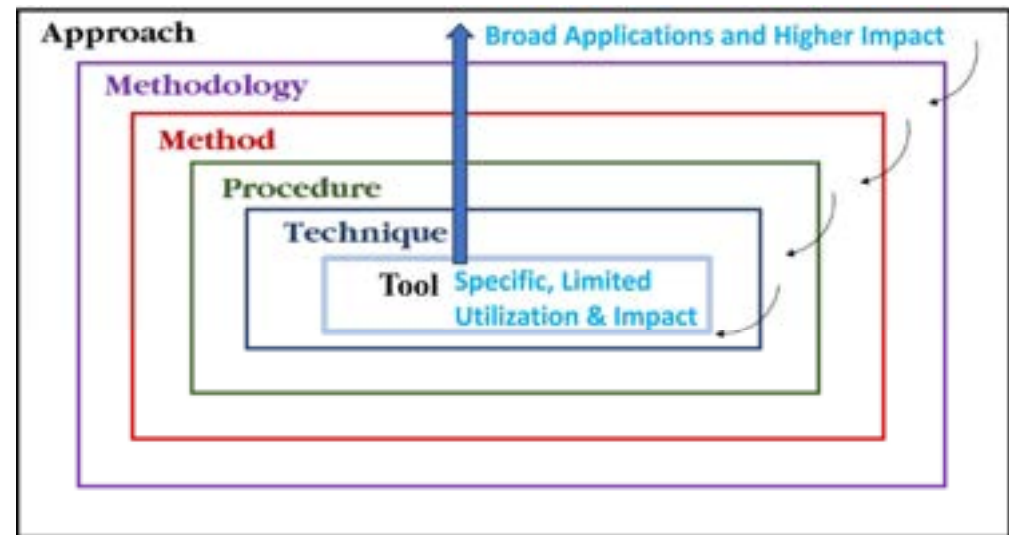
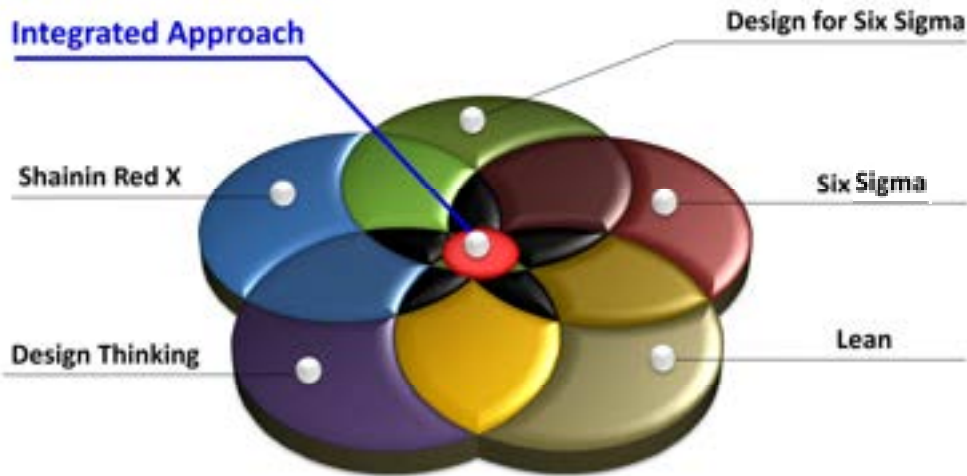


- I have led / coached 300+ projects to successful completion in sales, marketing, HR, R&D, IT, operations, service, supply chain etc.
- I questioned the status quo of only using one methodology in problem solving instead of using an integrated approach to achieve the best results.
- I have spent more than 10 years developing and refining a novel integrated approach to problem solving that covers the entire product / service cycle and integrates applicable tools from different methodologies
  - Design Thinking, DFSS, Lean, Shainin Red X and Six Sigma

# Problems Solving X.0 - Integrated Problem Solving Approach

A Innovative System Approach to Improve Problem Solving Effectiveness & Efficiency

Development of an innovative system approach to integrate appropriate problem solving methodologies for broad applications and to achieve higher Impact



**Integrated Problem Solving is an innovative system approach that combines the best tools, techniques, procedures, methods from appropriate methodologies to accomplish the aim of solving problems most effectively and efficiently.**



# Problem Solving X.0 Framework & Tools

# Problem Solving X.0 – Simplified Framework & Best Tools



Design Thinking



Design for Six Sigma

Varying Approaches

- F** Focus
- A** Approach
- C** Converge
- T** Test
- U** Understand
- A** Apply
- L** Leverage

Shainin Red X



Six Sigma



Lean

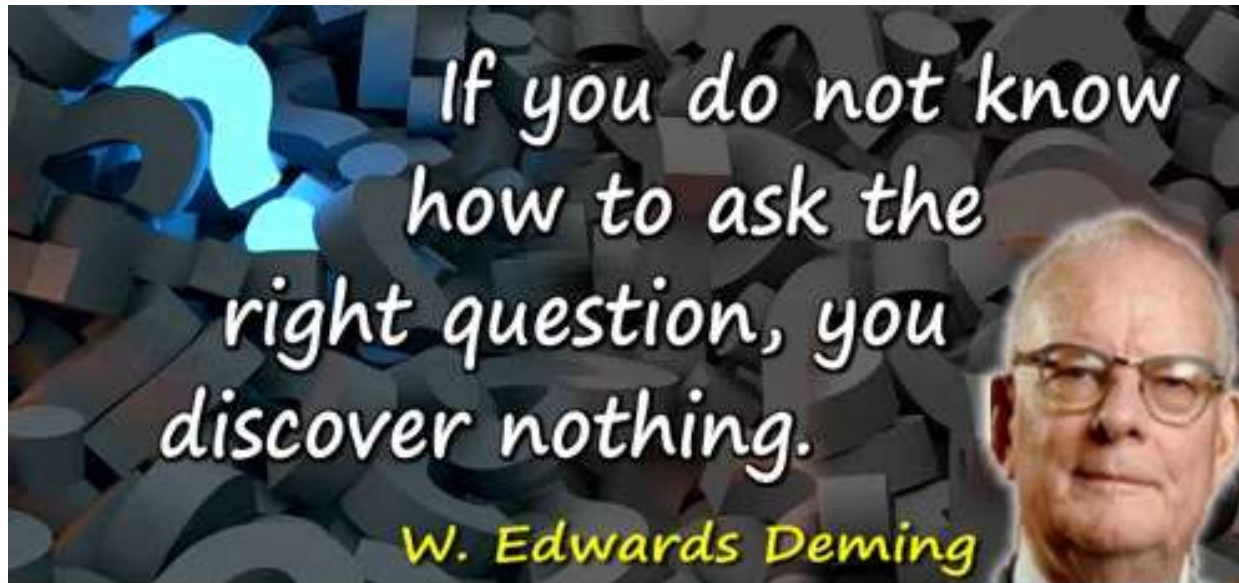
- |        |        |                 |
|--------|--------|-----------------|
| SS     | JIT    | TPM             |
| Muda   | Kaizen | Std. Work       |
| Mura   | TPM    | Visual Mgmt     |
| Muri   | VSM    | Poka-Yoke       |
| Kanban | SMED   | Constraint Mgmt |

## SIMPLIFIED FRAMEWORK



Integrated Approach utilizes the most appropriate and BEST TOOLS from all the problem solving methodologies to problems the MOST EFFECTIVELY and EFFICIENTLY.

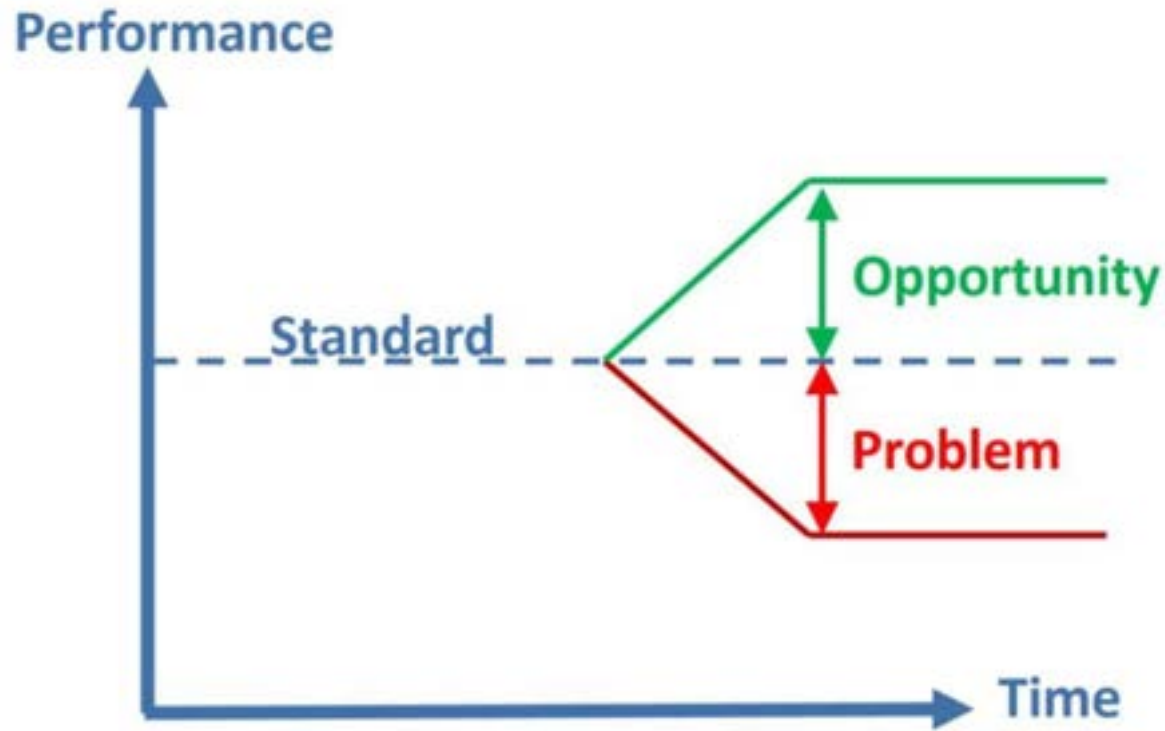
Problem Solving utilizes only specific and limited tools Associated with the methodology selected.



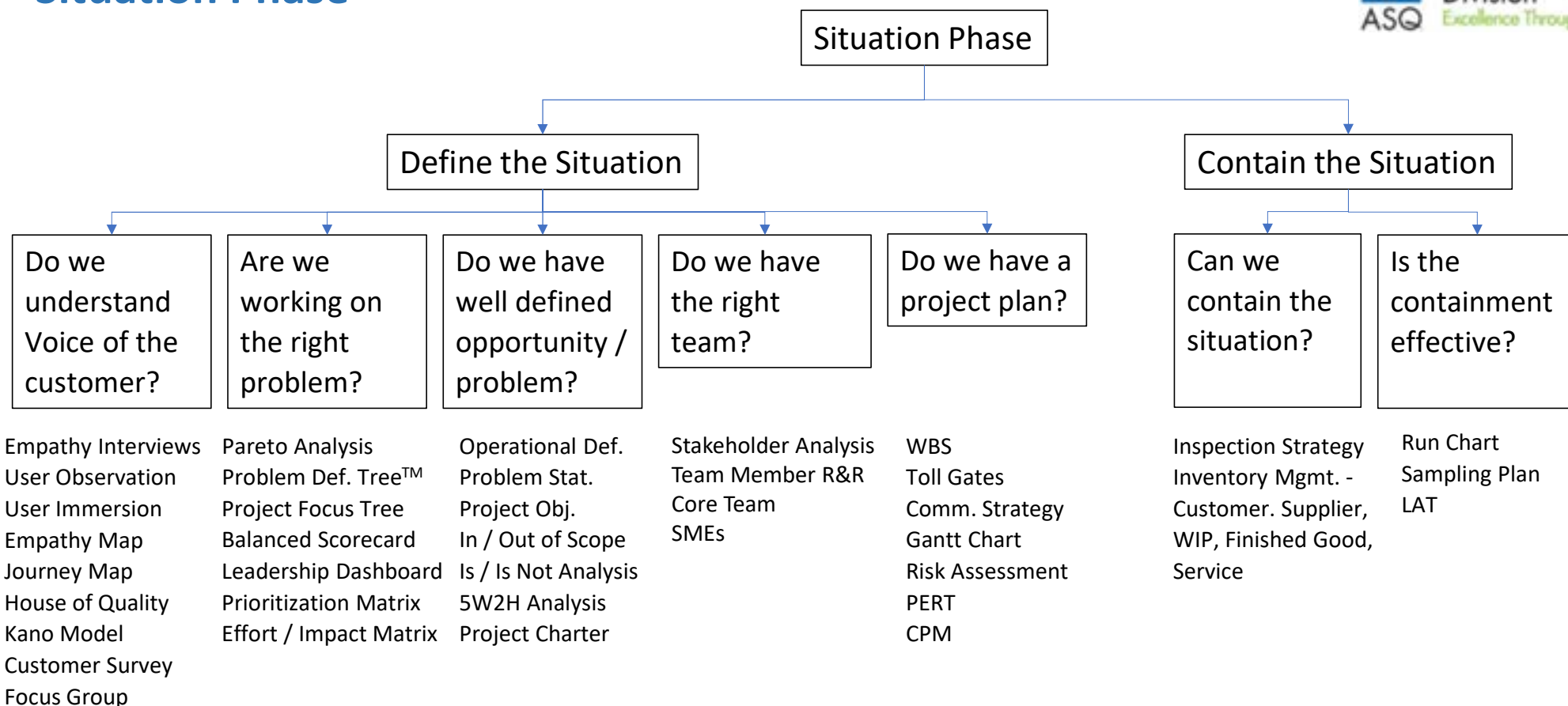
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# Situation Phase



# Situation Phase



# Analysis Phase

## Analysis Phase

### Ensure right metric & Measurement System

### Understand Baseline Process & Performance

### Converge to Root Cause

### Confirm Root Cause

Do we have clear metric that we are improving?

Do we have a good measurement system?

Do we understand the current process steps?

Do we have baseline performance data?

How do we determine root cause?

How do we know that we have truly found the root cause?

Project Definition Tree™  
Effective Green Y<sup>R</sup>

Isoplot™  
Component Search™ - Stage 0  
Sensory Scoring  
Transform™  
Attribute Audit  
MSA  
Attribute Agreement  
Gage R&R

Swimlane Map  
Detailed Process Map  
Value Stream Map

Data Collection Plan  
Control Chart  
Process Capability  
Histogram  
Box Plot

Strategy Diagram™  
Contrast Table  
5Whys  
Ishikawa Diagram  
Cause and Effect Matrix  
Correlation / Regression  
Gemba Walk  
Muda / Mura / Muri

Multi-Vari  
Control Charts  
Process Capability  
Concentration Diagram  
Group / Paired Comparison™

Hypothesis Testing  
Designed Experiments  
B vs W 6 Pack Test™

# Solution Phase



Solution Phase

Explore Multiple Solutions

Optimize Solution

Implement Solution

Have we explored multiple solutions?

Have we evaluated multiple solutions?

Do we need to build prototype to optimize solution?

Do we need to optimize the product / process parameters?

Should we try out the soln. before implement?

Did we get desired results after implement. of solution?

Are standard documents revised?

Is project closed & LL communicated?

- Brainstorming
- Nominal Group Technique
- Analogous Inspiration
- Yes And Group Activity

- Pugh Analysis
- Force Field Analysis
- SWOT Analysis
- Six Thinking Hats
- Prioritization Matrix

- Low Resolution Prototype
- High Resolution Prototype

- Taguchi Robust Design
- Taguchi Loss Function
- Ideal Function
- Parameter Design
- DOE
- Tolerance
- Parallelogram™
- Future State Process Map

- Pilot Run
- Simulation

- Visual Mgmt.
- Poka-Yoke
- Std. Work
- Training
- Control Chart
- Run Chart
- Cost Benefit Analysis

- Bill of Design
- Bill of Process
- Bill of Material
- DFMEA / PFMEA
- Control Plan

- Project Report
- Read Across
- Team Recognition



# Problem Solving X.0 Application Case Studies



# Problem Solving X.0 Application



## Application Case Study 1 – Healthcare – Doctors’ Practice

- **Situation:**
  - There was an opportunity to improve diabetic patient care at a practice with 2 doctors and 12 residents utilizing quality methodology
- **Framework / Methodologies Integrated:**
  - Design Thinking – Empathy Interview
  - Lean – 5S, Muda, One-Patient Flow, Standard Work
  - Six Sigma – Graphical Analysis to Reduce Variation, Process Map, Cost Benefit Analysis
  - Shainin Red X –BOB WOW days comparisons™
- **Results**
  - Diabetic patient care improved by 50%

My work and accomplishment were picked up By Detroit Free Press

### Engineered for health



Quality practices improve patient care

**BY JENNIFER KAPLAN**  
DETROIT FREE PRESS

The above picture depicts a pair of physicians and others, this is not a doctor's office. It's a hospital. The doctors, in white coats, are looking at a tablet. They are in a hospital. The doctors, in white coats, are looking at a tablet. They are in a hospital. The doctors, in white coats, are looking at a tablet. They are in a hospital.

...and the quality of care...  
...with the right...  
...the quality of care...  
...with the right...  
...the quality of care...  
...with the right...



## Application Case Study 2 – Sales & Planning

- **Situation:**

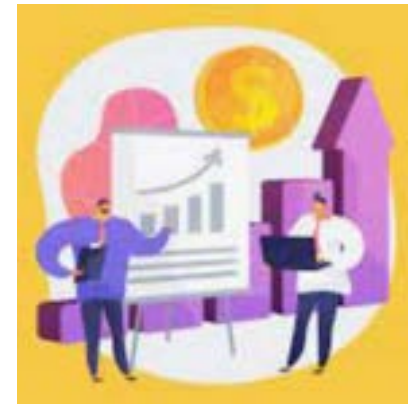
- Due to incorrect forecasting process of product volume early during product development process, organization was spending substantial capital investment that was not needed and caused sales to offer incentives to sell products – high end luxury product

- **Framework / Methodologies Integrated:**

- DFSS – Pugh Analysis, Robust Optimization, Simulation
- Lean – Value Stream Map
- Shainin Red X – Problem Definition Tree™, BOB WOW forecast comparisons™
- Six Sigma – Project Charter, Swimlane Map, Ishikawa Diagram, Box Plots, Effort Impact Matrix

- **Results:**

- \$32M in cost Avoidance



## Application Case Study 3 – Service

- **Situation:**

- Organization wanted increase revenue at dealership by use of certain add-on services and have been unsuccessful due to push back from dealers. Leadership thought they knew the reason for push back from dealer. A new leader kicked off a team to make one more try to increase revenue.

- **Framework / Methodologies Integrated:**

- Design Thinking: Empathy Interviews with all levels at leadership, Themes, Insights, How Might We Statement, Low Resolution Prototype
- DFSS: Kano Model, Pugh Analysis
- Shainin Red X – BOB WOW Group Comparison™
- Six Sigma – Project Charter, Detail Process Map, Muda Analysis, RASIC, Cost Benefit Analysis

- **Results:**

- \$40M+ Increased Revenue



## Application Case Study 4 – Manufacturing

- **Situation:**

- One of the door switches would function intermittently and team was struggling to find the root cause as there were many parts in the door as this could be a major customer dissatisfiers

- **Framework / Methodologies Integrated:**

- DFSS – Design Robustness Analysis, Parameter Design
- Shainin Red X – Modified Component Search™, Modified BOB WOW Comparison™
- Six Sigma – Project Charter, Detail Process Map
- Lean – Muda Analysis at OEM and the supplier

- **Results:**

- Crisis – Stop Ship condition avoided which would have cost millions



## Application Case Study 5 – Engineering

- **Situation:**

- At a final test for a luxury electric vehicle OEM, there were multiple rejects for continuity. Manufacturing had brought the issue to engineering and the design release engineer concluded that the root cause was that jumper harness connector was out of specification. Engineering then demanded that supplier quality of OEM work with the supplier to get the parts in specification and that will make problem resolved.

- **Framework / Methodologies Integrated:**

- DFSS – Robust Assessment, Robust Optimization, P-Diagram, Taguchi Loss Function
- Shainin Red X – BOB WOW Comparison™
- Six Sigma – Project Charter, Detail Process Map, DOE
- Lean – Value Stream Map

- **Results:**

- Eliminated scraping of out of spec. parts
- Eliminated a long lead time that was required to change process at the supplier



# Problem Solving X.0 Summary

## Why to Use Problem Solving X.0?

1. **Unique:** No one else offers such a problem solving that fully integrates these methodologies - Design Thinking, Design for Six Sigma, Lean, Shainin Red X and Six Sigma
2. **Creative:** Use of tools is based on the question the problem solving team needs to answer in the situation. Secondly, my integrated framework is streamlined to only three phases
3. **Useful:** Utilization for the entire product / service life cycle. I have applied this approach in multiple organizations of different sizes and different industries to solve problems effectively and efficiently
4. **Wide Application:**
  - Functions: Design, Sales, Planning, Engineering, Manufacturing, Supplier, Service, Support functions: HR, IT, Safety
  - Types of Industry: Manufacturing, Service
  - Size of Industry: Start-up, Small, Medium, Fortune 500



# Feedback



## Quote 1

Kush Shah is not content with maintaining the status quo. He is always seeking ways to improve the problem solving process, leading to innovative solutions that enhance problem solving capabilities of any organization. He immediately immersed himself in our operation to a point where he became one of us! Our leadership was so impressed by his integrated approach of problem solving that we are now having him teach this integrated problem solving approach to our entire organization – from top leadership to operators.

## Quote 2

Kush has trained engineering and manufacturing employees in his unique integrated approach to problem solving. Using his innovative approach, we have been able to solve several critical problems in a very short time. His integrated approach takes the best and most appropriate techniques from all different problem solving methodologies based on the questions the team is answering through the problem solving journey. We have found this approach to be extremely effective and efficient.



# How Can You Get Engaged With 'Integrated Problem Solving Approach' Movement?



1. Learn problem solving methodologies you are not familiar with it – Get out of your comfort zone
2. Apply the integrated problem solving approach to problems of your organization
3. Learn from what works and what does not work and refine your approach
4. Share the integrated problem solving approach with the leaders of your organization
5. Share the integrated problem solving approach with other quality professionals and your network
6. Become a member of ASQ Automotive Division



## Questions or Comments?



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