

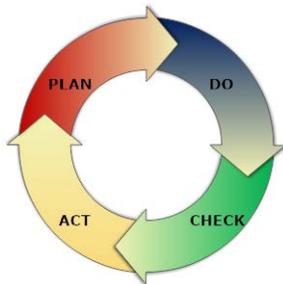
Quality Improvement Essentials Quick Reference Guide (QRG)

Your organization and Quality:

- Why do we need Quality?
 - Customer Satisfaction
 - Survival / Competition
 - Cost
- World-Class Performance

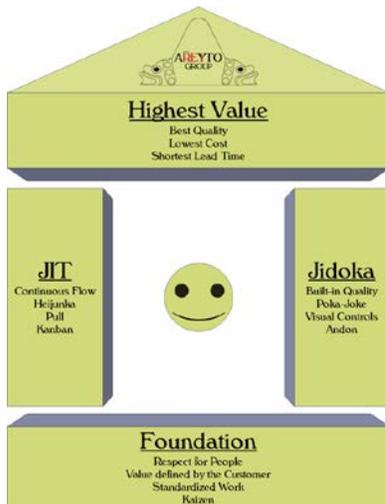
Quality Improvement Methods:

- Standard Problem Solving
- Plan-Do-Check-Act



- Aim Statements - SMART

- Lean



- Six Sigma - DMAIC



Define

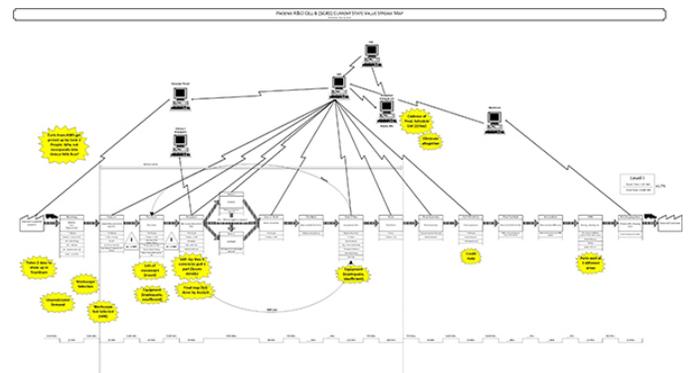
Project Charter: A document that clearly addresses an improvement project scope, target(s), project Champion, team involved and project timeline, etc.

Voice of the Customer: A term used in business to describe the process of capturing a customer's requirements. Specifically, the Voice of the Customer is a market research technique that produces a detailed set of customer wants and needs, organized into a hierarchical structure, and then prioritized in terms of relative importance and satisfaction with current alternatives.

Mapping

Process Flow Map: A mapping tool to show visually how a process or product flows. It differs from a simple *flowchart* in that it includes **Inputs** and **Outputs** of each steps and it further classifies the inputs as Controllable, Noise, SOP and Critical (X). Called **Process Map**, for short.

Value Stream Map: A mapping tool to show the interaction of information flow with product/material flow to identify opportunities. Used as project selection tool especially when determining potential bottlenecks and lack of linkage between processes and/or functions.



Communications Plan: A matrix or table describing the nature of communications you will have with your stakeholders throughout your project. It describes what to communicate, when, or how often to communicate it, and in which way, by which medium or in which venue.

Measure

Check Sheet: This is a very simple data collection and analysis tool used when one person is physically observing a process. The observer records a count of the observations, whether it is defects, calls, or anything else that is a discrete event.

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Histograms: This is the most commonly used graph to show frequency distributions. A frequency distribution shows how often each different value in a set of data occurs. It looks very much like a bar chart, but there are important differences between them. One of the most common applications for a histogram is when you want to have an idea of the shape of the data's distribution, especially when determining whether the data is distributed approximately normally.

Process Map: See above (Process Flow Map)

Analyze

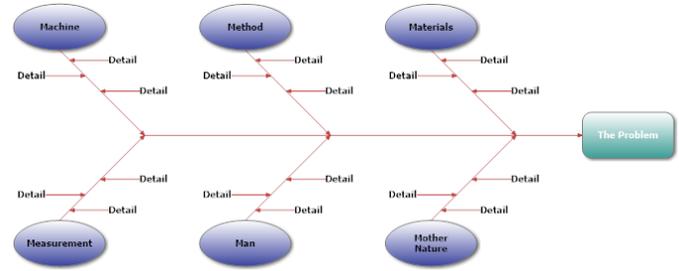
Pareto Chart: A tool for establishing priorities based on the Pareto principle, also known as the 80/20 rule, which is that 20% of the causes result in 80% of the impact. For example, 20% of the causes of defect opportunities tend to cause 80% of the defect opportunities. The Pareto chart uses attribute data with columns arranged in descending order, with highest occurrences (highest bar) shown first. It uses a cumulative line to track percentages of each category/bar, which distinguishes the 20 percent of items causing 80 percent of the problem. The purpose of this is to prioritize which problems should be solved.

Scatter Diagram: A basic graphic tool that illustrates the relationship between two variables. Scatter plots are used with variable data to study possible relationships between two different variables. Even though a scatter plot depicts a relationship between variables, it does not indicate a cause and effect relationship. Use Scatter plots to determine what happens to one variable when another variable changes value. It is a tool used to visually determine whether a potential relationship exists between an input and an outcome.

Run Chart: A graphical display often used in process variation studies in which observations (data points) are plotted to show the trend over time.

Five Whys: A method used to move a team past symptoms and understand the true root cause of a problem. It is said that only by asking "Why?" five times, successively, you can delve into a problem deeply enough to understand the ultimate root cause. There is nothing magic about the number "five". Sometimes you need only three, other times you might need eight.

Fishbone: A.K.A. Ishikawa Diagram. A brainstorming tool used for determining root-causes (the bones of the fish) for a specific effect, or problem. The problem statement or issue placed at the head of the fishbone is used as a starting point to trace the sources of the problem back to its actionable root cause. An example is shown at the top of the next column.



Improve

Brainstorming: A group creativity technique designed to generate a large number of ideas for the solution to a problem. The only rule is that "there are no rules". Do not stop the flow of ideas!

Affinity Diagram: A tool for grouping ideas into themes. Often used after a brainstorming session to identify themes of solutions, alternatives, root causes, etc.

Impact-Effort Grid: The Impact/Effort matrix allows you to organize those "possible options" in a structured way and enables you to make a well 'informed choice'. You avoid the risk to 'jump to conclusions' and might come up with actions that have better results with less effort. For each action, the matrix takes into account: 1) The impact an action has on the actual problem or challenge, and 2) the effort (money, time, etc.) it takes to implement the action successfully. This is a very subjective tool and you need to make sure you involve subject matter experts in this exercise.

Control

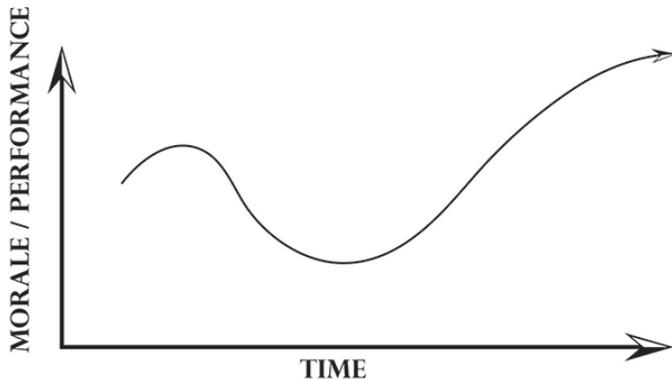
Control Plan: A process control document that logically describes the system for controlling processes and maintaining improvements in order to ensure that the organization consistently operates its processes such that products meet customer requirements all the times. For every possible scenario for a process to go out of control, a Control Plan describes actions to bring the process back in control and **accountability** for those actions.

SPC – Control Charts: Charts to monitor processes, identify performance issues, measure variation and capability, and distinguish between common and special cause. These charts are basically run charts with three lines added to them. These lines are the mean, the upper control limit (UCL) and the lower control limit (LCL). For repetitive processes, the control limits are generally set at $\pm 3\sigma$ around the process mean.

Change Management

Every improvement effort involves change. And change is hard for everybody. Change management is necessary to address the behaviors and cultural aspects of change.

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Everybody goes through this curve as they go through change. Everybody has to experience all the different emotions associated with change: anxiety, fear, frustration, despair, acceptance and excitement. Improvement experts must realize this and use change management to help people go through this curve as quickly as possible so that everybody achieves that excitement state at the earliest. We must become **Change Agents**.

Lean

Lean can be defined as the relentless elimination of waste in pursuit of perfection to maximize customer value.

Value

Value is defined by the customer. If the customer does not care about a step in the process, it is not value-added. For a step to be value-added, it must comply with the three C's:

- Customer is willing to pay for it
- Changes the thing (whatever you are producing, whether it is an actual product or a service, like the health status of a patient)
- Correct the first time – if a step is fraught with rework or scrap, it is not adding value

Waste: Anything that does not add value is waste.

[Original] Seven Types of Waste:

- **D**efects - do not meet customer requirements or create rework
- **O**ver Production - made too much and not used or sold.
- **T**ransportation - excess distance traveled.
- **W**aiting - idle time of operator or goods waiting until the next step.
- **I**nventory - excess amount purchased and waiting to be used.
- **M**otion - excess movement of operator and/or part.
- **P**rocessing - unnecessary or repeated steps performed.

Healthcare adds two more:

- **M**is-utilization of skills - using the wrong people for the wrong process
- **R**eprioritization - abandoning the task at hand due to a change in priorities

Memory aid for the nine wastes: **MR. DOTWIMP**

Lean Tools & Concepts

5S: A methodology for creating and maintaining a clean, organized, and high performing workplace. Its application results in safer working conditions and greater productivity/efficiency. Useful all the time whether to introduce a continuous improvement culture or included in the final design of a lean cell or line.



- Sorting - get rid of what is not needed
- Storage - a place for everything and everything in its place
- Shining - clean up what is left. Clean daily with visual sweeps
- Standardizing - make all areas function the same way. Integrate sort, storage and shine into regular work activities with maintenance and check points put in place.
- Sustaining – make it the way you do business. Set discipline following the rules, develop a schedule and stick to it, assign responsibilities.

Kaizen: A Japanese word typically translated to “continuous improvement.” Originally this word referred to subtle, gradual improvements that are made over time. A baseball analogy is hitting singles all game long to score runs.

Plan-Do-Check-Act: P-D-C-A or P-D-S-A as it is known in various industries is a structured, iterative process for improvement. Also known as the Shewhart cycle, it is analogous to the scientific method: have a hypothesis, test it and analyze it.

Visual Management: The use of Visual Controls (indicators of system performance) to understand the status of a process and to trigger action, if necessary, to correct a process.