DMAIC:
HANG YOUR TOOLS ON A SOLID MODEL

Old Dominion University
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Agenda

- The Reality of Performance Improvement
- Standing on the shoulders of GIANTS
- Performance Improvement Models
- Foundation for Professional Growth
- Springboard to Professional Success
The Power of Two Little Words

- Maintaining the status quo is easy
- Performance Improvement is hard because it requires change. Overcoming momentum requires energy.

“What if...?”

“Doing the same thing over and over again expecting a different result” is the definition of what?
Socratic Method

- Teaching through guided questioning
- Logical reasoning required
- Similar to a Thought Experiment
Scientific Method

- **S**tate the problem
- **G**ather information
- **F**orm a hypothesis
- **T**est the hypothesis
- **R**ecord and analyze data
- **S**tate the conclusion
- **R**epeat and communicate results
Progression of Understanding

- Random Chaos*
- Hypothesis
- Model
- Theory
- Law
- Predictable Order*

*Perception
“All models are ___________; some are useful.”

a. Beautiful
b. Informative
c. Wrong
d. Representative

George Box
Characteristics of Models

- Visual
- Understandable
- Usable
- Explainable
- Scalable
- Intuitive
- Elegant
- Memorable
Why use models?

- Memory Aids
- Sequencing
- Represent Complexity
- Scaffold Learning
- Develop Expertise
- Lead Change
PDCA
Change Model

1. Assess Organizational Readiness
2. Establish Sponsorship
3. Assess Present Capability and Culture
4. Define Desired State and Determine Strategy
5. Develop Enduring Sponsorship
6. Equip Team and Plan the Improvement
7. Implement the Capability Improvement
8. Measure Business Value of the Improvement

Desired State

Present State

Transition State

Managing Change

Change Strategy
Balanced Scorecard

- Vision & Strategy
- Financial Perspective
- Customer Perspective
- Learning & Growth Perspective
- Internal Process Perspective
BPR Model

Define the project
Review the business baseline
Identify opportunities
Verify the opportunities
Plan the achievement of the benefits
Review and report

MEO?
HPI Model

Analysis of Business Goals and interrelationship to performance

Performance Analysis
- Wanted Performance
- Actual Performance

GAP

Transfer and Intervention
- Project Management
- Assisting and coaching in/of the change Process
- Data collection

Cause Analysis
- Know How
- Motivation
- Resources
- Structure
- Processes
- Information
- Wellness

Evaluation (Processes & Results) and Return of Investment
## Human Behavior Model

<table>
<thead>
<tr>
<th>Environment</th>
<th>Vision, Strategy, Mission, Structure(s), Processes</th>
<th>Motivation</th>
<th>Techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Incentives &amp; Sanctions</td>
<td></td>
<td>Usage of information &amp; resources</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>People</th>
<th>Employability (where are discrepancies between function/position and work performed?)</th>
<th>Motivation (where do people not perform although it's their 'topic')</th>
<th>Knowledge Competencies Skills (what can 'model performers' do others cannot?)</th>
</tr>
</thead>
</table>
DMAIC Model

- DEFINE
  - IDENTIFY OPPORTUNITY
  - DESCRIBE AS-IS CONDITION
  - IDENTIFY KEY CAUSES
- MEASURE
- ANALYZE
  - PROPOSE & IMPLEMENT SOLUTIONS
- IMPROVE
- CONTROL
  - SUSTAIN THE GAIN
  - Validate & Replicate Changes
DMAIC Model (Deliverables)

**DEFINE**
- Problem Validated
  - Draft Charter Approved
  - SIPOC Completed
  - VOC Collected
  - CTQs Identified
  - Project Planned

**MEASURE**
- Problem Assessed & Focused
  - Process Mapped
  - Baseline Date Collected
  - Time Data Plotted & Analyzed

**ANALYZE**
- Root Causes Verified
  - Potential Causes Brainstormed
  - Potential Causes Organized & Selected
  - Cause-Effect Data Planned & Collected

**IMPROVE**
- Process Changed & Evaluated
  - Possible Solutions Brainstormed
  - Solutions Prioritized & Selected
  - Plans Developed

**CONTROL**
- Process Gains Maintained
  - Process Changes Documented
  - Process Changes Supported
  - Process DashboardInitiated
  - Lessons Learned Summarized
  - Future Plans Recommended
  - Full Scale Plans Initiated
  - Results Evaluated
### DMAIC Model (Tools)

#### Activities
- Review Project Charter
- Validate Problem Statement and Goals
- Validate Voice of the Customer and Voice of the Business
- Validate Financial Benefits
- Validate High-Level Value Stream Map and Scope
- Create Communication Plan
- Select and Launch Team
- Develop Project Schedule
- Complete Define Gate
- Identify Potential Root Causes
- Reduce List of Potential Root Causes
- Confirm Root Cause to Output Relationship
- Estimate Impact of Root Causes on Key Outputs
- Prioritize Root Causes
- Complete Analyze Gate
- Develop Potential Solutions
- Evaluate, Select, and Optimize Best Solutions
- Develop ‘To-Be’ Value Stream Map(s)
- Develop and Implement Pilot Solution
- Confirm Attainment of Project Goals
- Develop Full Scale Implementation Plan
- Complete Improve Gate
- Implement Mistake Proofing
- Develop SOP’s, Training Plan and Process Controls
- Implement Solution and Ongoing Process Measurements
- Identify Project Replication Opportunities
- Complete Control Gate
- Transition Project to Process Owner

#### Tools
- Value Stream Mapping
- Value of Speed (Process Cycle Efficiency / Little’s Law)
- Operational Definitions
- Data Collection Plan
- Statistical Sampling
- Measurement System Analysis (MSA)
- Gage R&R
- Kappa Studies
- Control Charts
- Histograms
- Normality Test
- Process Capability Analysis
- Process Constraint ID and Takt Time Analysis
- Cause and Effect Analysis
- FMEA
- Hypothesis Tests/Conf. Intervals
- Simple and Multiple Regression
- ANOVA
- Components of Variation
- Conquering Product and Process Complexity
- Queuing Theory
- Replenishment Pull/Kanban
- Stocking Strategy
- Process Flow Improvement
- Process Balancing
- Analytical Batch Sizing
- Total Productive Maintenance
- Design of Experiments (DOE)
- Solution Selection Matrix
- Piloting and Simulation
- Mistake-Proofing/Zero Defects
- Standard Operating Procedures (SOP’s)
- Process Control Plans
- Visual Process Control Tools
- Statistical Process Controls (SPC)
- Solution Replication
- Project Transition Model
- Team Feedback Session

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**Measure**

- Value Stream Map for Deeper Understanding and Focus
- Identify Key Input, Process and Output Metrics
- Develop Operational Definitions
- Develop Data Collection Plan
- Validate Measurement System
- Collect Baseline Data
- Determine Process Capability
- Complete Measure Gate

**Analyze**

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### Identify and Implement Quick Improvements

- RIE/Kaizen, 5S, Value Analysis, Generic Pull Systems, Four Step Rapid Setup Method
- Replenishment Pull/Kanban
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Build your Project Plan
Know your Tool Characteristics

What factors do you consider when choosing a tool?

- Successful outcome
- Familiarity
- Good fit
- Time / Resources
- Training
- Understandability
Levels of Expertise

Inventor
Teacher
Proficient
User
Aware
Novice
Apprentice
Journeyman
Master
Professional

Time
Assess your Tool Expertise

Look Back At Past Performance

Set Vision for Future Performance
Challenge: Use DMAIC

- To develop your expertise on tools you already use
- To selectively add new tools to your professional toolbox
- To selectively add new models to your professional inventory
- To lead change
- To enrich your life...its not a stretch
Contact Information

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