

Participant Guide and Features

Issue The IT group wanted an eight-hour “yellow belt” course to leverage twenty-three of the powerful tools that accompany the LEAN Six Sigma methodology.

Additionally, they needed:

- a way to remind meeting participants which tool was in use
 - to keep twenty-one introverted people engaged and relaxed
 - a method to summarize each tool and “keep them all straight”
-

Solution

The course I created provided:

- a brief overview of LEAN Six Sigma
- in-depth analysis of one tool per person using a structured form
- form examples using tools not covered by students
- sharing of tool analyses with the group
- colored copies of each tool analysis form
- 8.5” x 5.5” cardstock cards with a pictogram of each tool for use in meetings (see examples below)



- reference materials
- several small group exercises
- pre-work in the form of an eLearning course.

The pictograms were simple pictures to associate with the various tools. The pictogram went on the analysis form in addition to the cardstock cards.

The layout of the participant guide is one I developed to increase the value and usability of handouts. The features of the layout are:

- Solid blocks at the top of the page, to the outside, showing the section title to make it easier to locate a section
- Solid blocks at 90° to the section title blocks, with the course title
- Page number in the upper outside corner
- Note taking areas to the outside of each page, which makes it easy for right-handed and left-handed people to take notes
- Name of the course at the bottom, to the outside
- Images of PowerPoint slides on the left page
- Enlarged versions of complex or smaller graphics

See two pictogram cards pages 3 & 6, their corresponding tool analyses (pages 4-5, 7-8) and the participant guide on pages 9 – 50 (note that the page numbers are for this document and not the participant guide).

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Participant Guide and Features, Continued

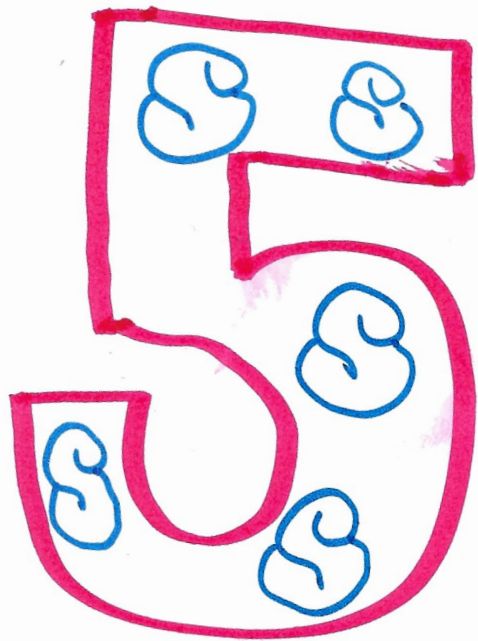
Results The participants appreciated the variety of learning styles that I used as well as not having to endure eight hours of “slide-whipping” and lecture. The feedback was mostly positive and the comments helpful for future courses.

Classifications The table below lists three classifications for this work sample.
The table below lists three classifications for this work sample.

Learning Styles	Intelligences¹	Example of ²
Visual	Logical-Mathematical	Creativity
Kinesthetic	Linguistic-Verbal	Learning Style diversity
Aural	Intrapersonal	
Verbal	Interpersonal	
Logical	Bodily-Kinesthetic	
Social	Visual-Spatial	
Solitary		

¹ Intelligences refers to Gardner’s Multiple Intelligences.

² Reason(s) it was provided as a work sample



Tool Name: 5 S's

Purpose

Check the box next to the most applicable category below:

- Idea/Solution Generation
- Issue Exploration
- Prioritization
- Process Analysis-Macro/ investigation
- Process Analysis-Detailed/ issue-focused
- Process Analysis-Micro/ Control

General description

In the space below, describe the tool including the purpose of the tool and why / when you might use it.

When to use

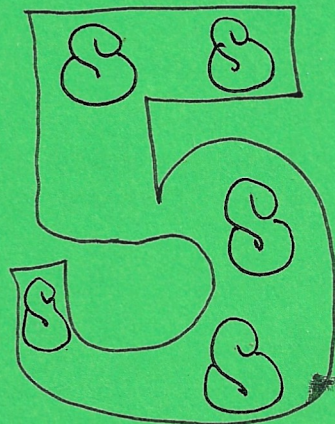
- Whenever a workplace is messy, unorganized
- Whenever people have to spend time tracking down tools, info, etc. required to complete a task.
- In an DMAIC phases

Purpose

- To create and maintain an organized, clean, safe and high performance workplace.
- 5S enables anyone to distinguish between normal and abnormal conditions at a glance
 - 5S is the foundation for continuous improvement, zero defects, cost reduction, and a safe work area.
 - 5S is a systematic way to improve the workplace processes, and products through production line employee involvement.

Pictogram

On scratch paper, create a basic/elementary symbol or picture that would remind you and others think of this tool; the simpler the symbol the better! Once you are satisfied, copy the symbol to the space below AND copy the symbol to the card stock provided.



Tool Name: 5 S's, Continued

How In the space below, list the steps for using the tool.

1. S1-Sort: Remove all items from work place not needed for production tasks
2. S2-Set in Order (Simplify):
Arrange all needed work items in a line with the physical work flow, and make them easy to locate and use
 - a. Draw a current state map
 - b. Draw a future state map
 - c. Visually organize the work place
3. S3-Shine: Remove the dirt, grime, and dust from the work area

3. S3 (continued)
 - a. Determine shine targets
 - b. Set a housekeeping schedule and assign responsibilities
 - c. Create procedures for continued daily shine process
 - d. Set periodic inspection and targets for machinery, equipment, computers, etc.
4. S4-Standardize: create a consistent way to perform daily tasks.
5. S5-Sustain: develop a discipline that ensures continued success

Tips In the space below, list any highlights or tips you gleaned from your research

- Use 5S in manufacturing as one of the 1st Improve actions, because it will make other tools such as setup reduction more effective
- Use In an office environment as a later Improve step or as part of standardization and cross-training in Control

Page Number(s) In the spaces provided, write the pages numbers where you found material describing this tool. If the topic is not covered in a book, enter "N/A"

<u>Page Number(s)</u>	<u>Book</u>
<u>206-212</u>	"LEAN Six Sigma Pocket Toolbook" by George, et. al.
	"The Six Sigma Way Team Fieldbook" by Pande, et. al.



Tool Name: Stakeholder Analysis

Purpose

Check the box next to the most applicable category below:

- Idea/Solution Generation
- Issue Exploration
- Prioritization
- Process Analysis-Macro/ investigation
- Process Analysis-Detailed/ issue-focused
- Process Analysis-Micro/ Control

General description

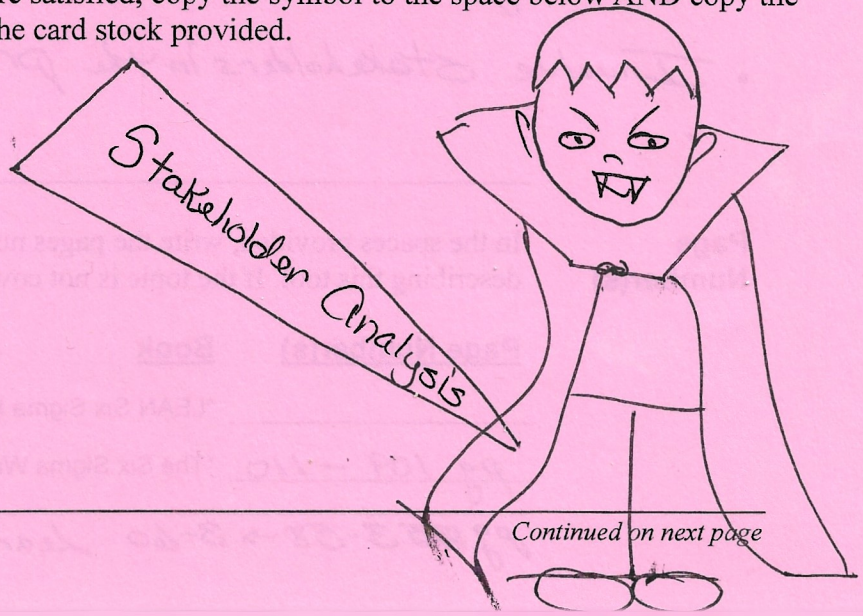
In the space below, describe the tool including the purpose of the tool and why / when you might use it.

This tool is used early in the project to help the team develop a communication strategy + ideas for keeping those outside of the team informed of the team's progress.

This tool helps a team stay linked with people/groups inside + outside the organization who can influence its success -

Pictogram

On scratch paper, create a basic/elementary symbol or picture that would remind you and others think of this tool; the simpler the symbol the better! Once you are satisfied, copy the symbol to the space below AND copy the symbol to the card stock provided.



Continued on next page

Tool Name: Stakeholder Analysis, Continued

How In the space below, list the steps for using the tool.

1. Brainstorm with all groups/individuals who have a stake in the project.
2. Sort + organize brainstormed ideas to get an agreed-on list.
3. Evaluate each stakeholder's relationship to the project + check appropriate boxes on the form
4. Develop strategies for dealing with each stakeholder.
5. Assign responsibilities in the team for carrying out each strategy.

Tips In the space below, list any highlights or tips you gleaned from your research

- Consider Customers, suppliers, associates
- Consider each stakeholder's positions
- Convert or neutralize the blockers
- Don't ignore the supporters!
- Involve stakeholders in the project

Page Number(s) In the spaces provided, write the page numbers where you found material describing this tool. If the topic is not covered in a book, enter "N/A"

Page Number(s) Book

____ "LEAN Six Sigma Pocket Toolbook" by George, et. al.

pg 109 - 110 "The Six Sigma Way Team Fieldbook" by Pande, et. al.

pg 3-58 → 3-60 Lean Green Belt Training Book

LEAN Six Sigma Yellow Belt for IT- Overview

Slide 2

Six Sigma Yellow Belt Learning Objectives

After this course, the Information Technology people will be able to:

- List the 4 points of the LEAN Six Sigma philosophy
- List the phases in a LEAN Six Sigma initiative

...after referring to this handout. They will also be able to:

- Describe the purpose of the LEAN Six Sigma tools
- Contribute in meetings utilizing LEAN Six Sigma tools

...after consulting the reference guide created in this course.

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Slide 3

LEAN Six Sigma - The Philosophy

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Slide 4

LEAN Six Sigma – The Philosophy

- Find the REAL ROOT causes
- Identify Customer Needs
- Measure the Results
- Maintain & Expand the Results

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Learning Objectives

After this course, the Information Technology people will be able to:

- List the 4 points of the LEAN Six Sigma philosophy
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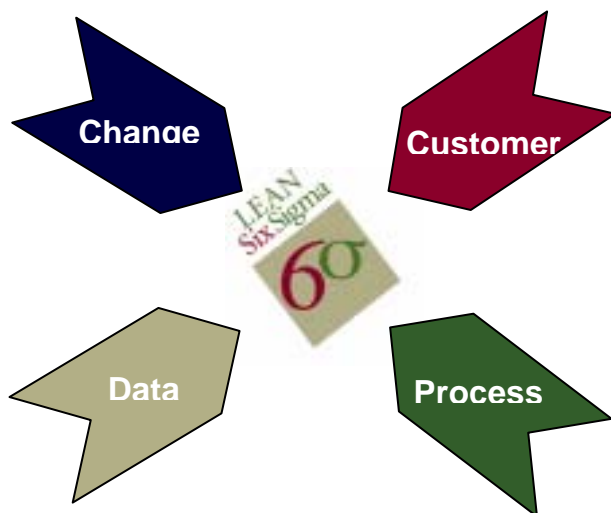
...after consulting the reference guide created in this course.

LEAN Six Sigma Philosophy

The elements that comprise the LEAN Six Sigma philosophy are:

- Find the REAL ROOT causes
- Identify Customer Needs
- Measure the Results
- Maintain & Expand the Results

They all work in concert to produce process improvement results via a logical and reliable method.



Slide 5

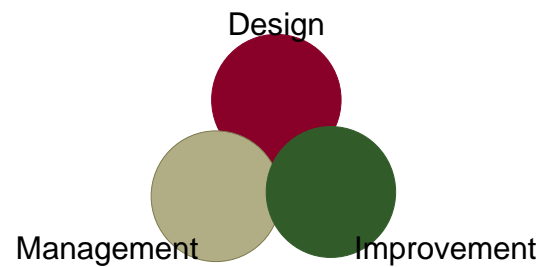
LEAN Six Sigma Philosophy Exercise

- **Objective:** Develop a way to help remember the 4 points of the Six Sigma philosophy
- **Process:** In groups of 3, devise a way to remember the 4 points of the Six Sigma philosophy using mnemonics, puzzle, word search, crossword, etc.
- **Timing:** 15 min.



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Slide 6

LEAN Six Sigma- Three Parts to a Whole

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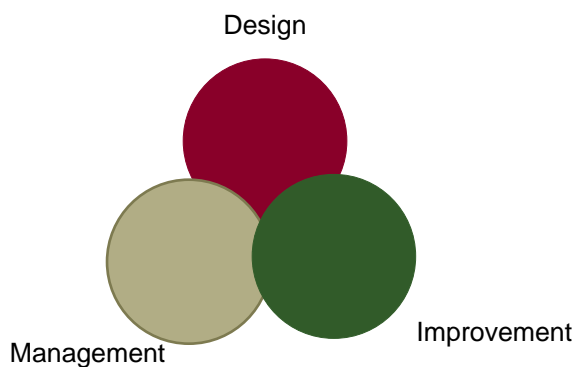
Exercise

- **Objective:** Develop a way to help remember the 4 points of the Six Sigma philosophy
- **Process:** In groups of 3, devise a way to remember the 4 points of the Six Sigma philosophy using mnemonics, puzzle, word search, crossword, etc.
- **Timing:** 15 min.

Three Parts to a Whole

There are three aspects to LEAN Six Sigma:

- **Design (DMADV)**-used to completely re-engineer a process or create a process where one does not exist today. DMADV stands for: Define, Measure, Analyze, Design, and Verify.
- **Improvement (DMAIC)**-used to improve a process when a solution is not known and the root cause is either not known or there is risk in being wrong. DMAIC stands for Define, Measure, Analyze, Improve, and Control.
- **Management**-aligning the business along processes from the customer's perspective. Monitoring the business processes allows the company to be proactive in addressing improvements and opportunities.



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LEAN Six Sigma Yellow Belt for IT- Roadmap

Slide 9

What is Six Sigma DMAIC?

- **Define:** CTQ's - Critical to Quality Characteristics. Review measurement systems and key indices.
- **Measure:** "defects."
- **Analyze:** Use statistical methods and tools. Determine causal factors/drivers of variation & waste.
- **Improve:** Focus on key variables that cause problems.
- **Control:** Monitoring processes to ensure implementation

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Slide 10

LEAN Six Sigma The DMAIC Improvement Process

Make problem "actionable"	Validate root cause	Implement Solution	Control/Monitor
1. Clarify problem	1. Walk the process	1. Brainstorm	1. Document
2. Scope	2. Collect & analyze data (statistics)	2. Pilot	2. Communicate
3. Obtain resources		3. Validate Improvement	3. Celebrate
4. List Potential causes		4. Quantify financial value	4. Monitor
5. Map value stream			5. Respond
6. Measure			6. Replicate

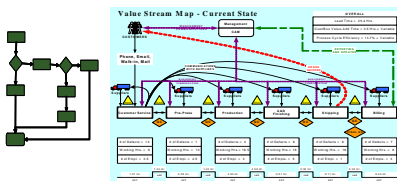
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What is Six Sigma DMAIC?

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- **Measure:** "defects."
- **Analyze:** Use statistical methods and tools. Determine causal factors/drivers of variation & waste.
- **Improve:** Focus on key variables that cause problems.
- **Control:** Monitoring processes to ensure implementation

The DMAIC Improvement Process

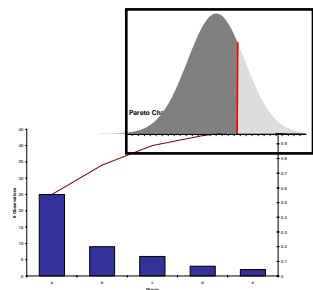
Define/Measure



Make problem "actionable"

1. Clarify problem
2. Scope
3. Obtain resources
4. List Potential causes
5. Map value stream
6. Measure

Analyze



Validate root cause

1. Walk the process
2. Collect & analyze data (statistics)

Improve



Implement Solution

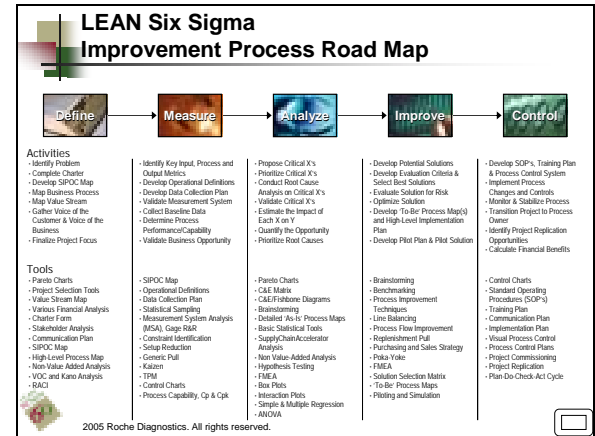
1. Brainstorm
2. Pilot
3. Validate Improvement
4. Quantify financial value

Control/ Monitor



1. Document
2. Communicate
3. Celebrate
4. Monitor
5. Respond
6. Replicate

Slide 11



Improvement Process Road Map

The tools listed below in **bold** will be addressed in this course.

Define



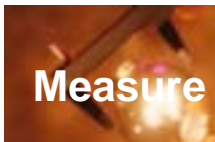
Activities

- Identify Problem
- Complete Charter
- Develop SIPOC Map
- Map Business Process
- Map Value Stream
- Gather Voice of the Customer & Voice of the Business
- Finalize Project Focus

Tools

- **Pareto Charts**
- Project Selection Tools
- **Value Stream Map**
- Various Financial Analysis
- Charter Form
- **Stakeholder Analysis**
- Communication Plan
- **SIPOC Map**
- **High-Level Process Map**
- **Non-Value Added Analysis**
- VOC and Kano Analysis
- RACI

Measure



Activities

- Identify Key Input, Process and Output Metrics
- Develop Operational Definitions
- Develop Data Collection Plan
- Validate Measurement System
- Collect Baseline Data
- Determine Process Performance/Capability
- Validate Business Opportunity

Tools

- **SIPOC Map**
- Operational Definitions
- Data Collection Plan
- Statistical Sampling
- Measurement System Analysis (MSA), Gage R&R
- Constraint Identification
- Setup Reduction
- Generic Pull
- **Kaizen**
- TPM
- **Control Charts**
- **Process Capability, Cp & Cpk**

Analyze



Activities

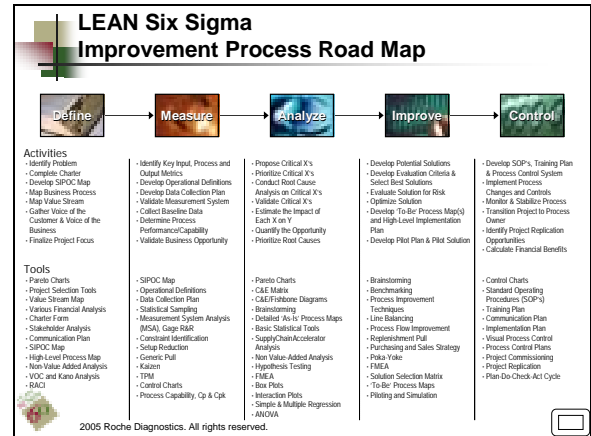
- Propose Critical X's
- Prioritize Critical X's
- Conduct Root Cause Analysis on Critical X's
- Validate Critical X's
- Estimate the Impact of Each X on Y
- Quantify the Opportunity
- Prioritize Root Causes

Tools

- **Pareto Charts**
- C&E Matrix
- **C&E/Fishbone Diagrams**
- **Brainstorming**
- **Detailed 'As-Is' Process Maps**
- Basic Statistical Tools
- Supply Chain Accelerator Analysis
- **Non Value-Added Analysis**
- Hypothesis Testing
- FAME
- Box Plots
- Interaction Plots
- Simple & Multiple Regression
- ANOVA

Continued on page 7

Slide 11 continued



Improve**Activities**

- Develop Potential Solutions
- Develop Evaluation Criteria & Select Best Solutions
- Evaluate Solution for Risk
- Optimize Solution
- Develop 'To-Be' Process Map(s) and High-Level Implementation Plan
- Develop Pilot Plan & Pilot Solution

Tools

- **Brainstorming**
- Benchmarking
- Process Improvement Techniques
- Line Balancing
- Process Flow Improvement
- Replenishment Pull
- Purchasing and Sales Strategy
- **Poka-Yoke**
- FAME
- **Solution Selection Matrix**
- 'To-Be' Process Maps
- Piloting and Simulation

Control**Activities**

- Develop SOP's, Training Plan & Process Control System
- Implement Process Changes and Controls
- Monitor & Stabilize Process
- Transition Project to Process Owner
- Identify Project Replication Opportunities
- Calculate Financial Benefits

Tools

- **Control Charts**
- Standard Operating Procedures (SOP's)
- Training Plan
- Communication Plan
- Implementation Plan
- Visual Process Control
- **Process Control Plans (FMEA)**
- Project Commissioning
- Project Replication
- Plan-Do-Check-Act Cycle

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LEAN Six Sigma Yellow Belt for IT-Tools

The alphabetical list of tools below can be found on the indicated page


5 S's.....	11	Pareto.....	7
Brainstorming (Anti-solution).....	11	Poka Yoke (Mistake Proofing).....	11
Brainstorming (Object Analogy)	19	Prioritization Matrix (X-Y Matrix).....	19
Control Chart.....	17	Process Flow Chart	9
Core, Key and Sub-Process Map	21	Product Family Matrix	9
Cpk (Capability Analysis).....	15	SIPOC.....	7, 13
Deployment Flow Chart.....	15	Spaghetti Diagram.....	21
Fishbone Diagram	5	Stakeholder Analysis	5
FMEA (Control Plan).....	5	Tree Diagram (CTQ Tree).....	13
Histogram	13	VA/NVA Analysis	9
Kaizen Blitz.....	19	Value Stream Mapping	15
Multi-voting.....	7		

Slide 13

Tool Research-EXERCISE

- Objective: Gain exposure to all the Six Sigma tools and depth in one tool.
- Process: Research and report back on the following aspects for the assigned tool:
 - Purpose/Category
 - General Description:
 - Pictogram
 - How to do it
 - Highlights/Tips
 - Page Numbers for References
- Share findings with the group
- Timing:
 - Research and scribing: 15 minutes
 - Sharing: 2 minutes each.

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Tools

- Product Family Matrix*
- SIPOC
- Process Flow Chart
- VA/NVA Analysis
- Fishbone
- Multi-voting
- Data display (Pareto)
- 5 S's
- Poka Yoke (Mistake Proofing)
- FMEA (Control Plan)
- Brainstorming (Object Analogy)*
- Value Stream Mapping
- Deployment flow chart
- Tree Diagram (CTQ Tree)
- Brainstorming (Anti-solution)*
- Prioritization Matrix (L Matrix, XY Matrix)
- Data display (Histogram)
- CPk (Capability Analysis)
- Control Chart
- Kaizen Blitz*
- Spaghetti diagram*
- Core, Key and Sub-Process Map
- Stakeholder Analysis

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Exercise-Tool Research

- **Objective:** Gain exposure to all the Six Sigma tools and depth in one tool.
- **Process:** Research and report back on the following aspects for the assigned tool:
 - Purpose/Category
 - General Description:
 - Pictogram
 - How to do it
 - Highlights/Tips
 - Page Numbers for References
- Share findings with the group
- **Timing:**
 - Research and scribing: 15 minutes
 - Sharing: 2 minutes each.

Scenario 1

Practice of the tools will center around two scenarios:

- Scenario 1-completing a tax return
- Scenario 2-requesting software

Tools

Below is the list of tools we will review and practice. They are listed in alphabetical order, not the order in which we will address them.

- 5 S's
- Brainstorming (Anti-solution)
- Brainstorming (Object Analogy)
- Control Chart
- Core, Key and Sub-Process Map
- CPk (Capability Analysis)
- Data display (Histogram)
- Data display (Pareto)
- Deployment flow chart
- Fishbone
- FMEA (Control Plan)
- Kaizen Blitz
- Multi-voting
- Poka Yoke (Mistake Proofing)
- Prioritization Matrix (L Matrix, X-Y Matrix)
- Process Flow Chart
- Product Family Matrix
- SIPOC
- Spaghetti diagram
- Stakeholder Analysis
- Tree Diagram (CTQ Tree)
- VA/NVA Analysis
- Value Stream Mapping

Slide 17

Fishbone-Exercise

- Effect: What makes it difficult to complete a tax return
- Use the following "bones":
 - Man (people)
 - Method
 - Material
 - Machine
 - Measure
 - Mother Nature (environment)
- Put your ideas on post-its
- TIMING:
 - 15 minutes to brainstorm

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Slide 18

Stakeholder Analysis-Demonstration

Stakeholder	Relationship to Project				Position		Communication/Involvement Strategy			
	Identify	Classify	Assess	Monitor	Internal	External	Frequency	Formality	Direction	Other (Describe)
Service Request Responder	X	X				X				Provide Project Updates
Service Request Process Owner	X	X	X	X	X	X				Assign tasks, if possible

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Slide 19

FMEA (Control Plan)-Group Exercise

- Potential Failure Modes: Provide 5 things that could go wrong when completing a tax return
- Potential Effect (s) of Failure
- Rate the:
 - Severity
 - Occurrence
 - Detection
- Which failure mode would you address first?

Potential Failure Mode (PFM)	Potential Effect (s) of Failure	Severity	Occurrence	Detection	RPN

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Fishbone Diagram- Exercise

- **Effect:** What makes it difficult to complete a tax return
- Use the following “bones”:
 - Man (people)
 - Method
 - Material
 - Machine
 - Measure
 - Mother Nature (environment)
- Put your ideas on post-its
- **TIMING:**
 - 15 minutes to brainstorm

Stakeholder Analysis-Demonstration

Disclose the results of this tool with care. Nobody wants to be considered a “blocker”!

Stakeholder	Relationship to Project					Position			Commitment/Involvement Strategy				Other (Describe)
	Is affected by outcome	Can influence outcome	Has useful expertise	Provides resources	Has decision authority	Blocker	Neutral	Supporter	Meet with regularly	Invite to team meetings	Send copy of mtg minutes	Speak with informally as needed	
Service Request Requestor	X		X					X					Provide Project Updates
Service Request Process Owner	X	X	X	X	X		X	X		X			Assign tasks, if possible

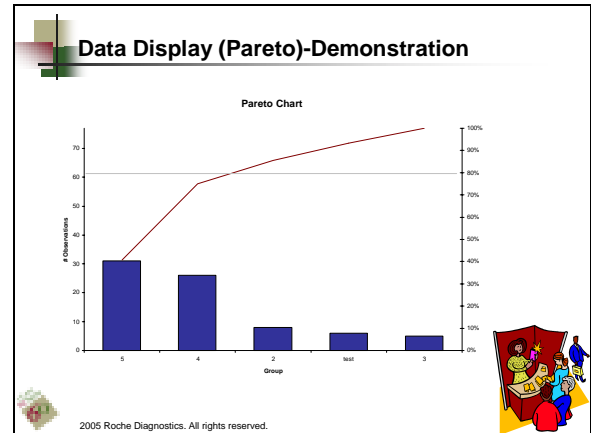
For a copy of this tool, visit the Six Sigma web site.

FMEA (Control Plan)-Group Exercise

- **Potential Failure Modes:** Provide 5 things that could go wrong when completing a tax return
- **Potential Effect (s) of Failure**
- **Rate the:**
 - Severity
 - Occurrence
 - Detection
- **Which failure mode would you address first?**

For a copy of this tool, visit the Six Sigma web site.

Slide 20



Slide 21

Multi-voting-Exercise

- Using the Fishbone Diagrams, vote for cause with greatest impact: N/3
- Report:
 - Identify the person in your group with most # of legs (mammalian) in household
 - That person will tell us the "cause" that received the highest # of votes
- TIMING: 5 minutes to vote

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Slide 22

SIPOC-Exercise

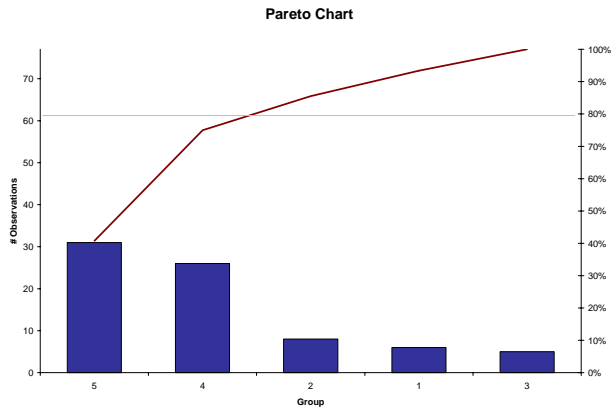
- Create a SIPOC for the completing a tax return
- Try to do the "P" first
 - First step: Gather necessary data/paperwork
 - Last step: Send completed tax return
- Complete other columns in this suggested order:
 - Output(s) (nouns)
 - Customer(s) (personal nouns)
 - Inputs(s) (nouns)
 - Supplier(s) (personal nouns)
- TIMING: 15 minutes

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Data Display (Pareto)-Demonstration

To create a Pareto Chart in Excel:

1. Create =Countif() formulas for each factor.
2. Sort the results “Descending”
3. Create a bar chart of the sorted results
4. Contact the instructor for details such as creating the Cum line.



Multi-voting-Exercise

- Using the Fishbone Diagrams, vote for cause with greatest impact: N/3
- **Report:**
 - Identify the person in your group with most # of legs (mammalian) in household
 - That person will tell us the “cause” that received the highest # of votes
- **TIMING:** 5 minutes to vote

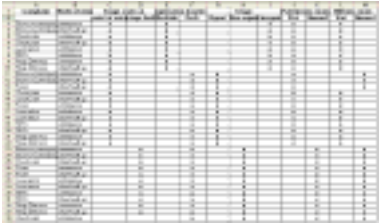

SIPOC-Exercise

- Create a SIPOC for the completing a tax return
- Try to do the “P” first
 - First step: Gather necessary data/paperwork
 - Last step: Send completed tax return
- Complete other columns in this suggested order:
 - Output(s) (nouns)
 - Customer(s) (personal nouns)
 - Inputs(s) (nouns)
 - Supplier(s) (personal nouns)
- **TIMING:** 15 minutes

For a copy of this tool, visit the Six Sigma web site.

Slide 23

Product Family Matrix-Demo
 Example: Emergency Room





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Slide 24

Process Flow Chart-Exercise

- Use Post-It® Notes to create a detailed flow chart for completing a tax return
- Use a Flip Chart or tear off paper
- Start with the 5-7 steps you created for the SIPOC
- Don't put in any lines until you are all done.
- TIMING: 15 minutes




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Slide 25

VA/NVA Analysis-Exercise

- Mark steps on your process map as:
 - Value-Adding (VA) in Green
 - Business-Enabling (BE) in Black
 - Non-Value-Adding (NVA) in Red
- Use the following criteria for VA:
 1. Transforms the item or service toward completion
 2. Customer would be willing to pay for it
 3. Done right the first time (i.e. not rework of upstream errors)
- TIMING: 20 minutes



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Product Family Matrix-Demonstration

Example: Emergency Room

1	A	B	C	D	E	F	G	H	I	J	K	L	M
2	Complaint	Mode of entry	Triage starts at		registration location		Triage			Patient into room		MD into room	
3			point of entry	triage desk	Bedside	Desk	Urgent	Non-urgen	Emergent	Stat	Queued	Stat	Queued
3	Bone or joint injury	ambulance	x		x				x	x		x	
4	Bone or joint injury	drive/halk up	x		x				x	x		x	
5	Chest pain	ambulance	x		x				x	x		x	
6	Chest pain	drive/halk up	x		x				x	x		x	
7	Laceration	ambulance	x		x				x	x		x	
8	MVA	ambulance	x		x				x	x		x	
9	Resp Distress	ambulance	x		x				x	x		x	
10	Resp Distress	drive/halk up	x		x				x	x		x	
11	Bone or joint injury	ambulance	x			x	x			x			x
12	Bone or joint injury	drive/halk up	x			x	x			x			x
13	Fever	drive/halk up	x			x	x			x			x
14	Chest pain	ambulance	x			x	x			x		x	
15	Chest pain	drive/halk up	x			x	x			x		x	
16	Fever	ambulance	x			x	x			x		x	
17	Laceration	ambulance	x			x	x			x		x	
18	Laceration	drive/halk up	x			x	x			x		x	
19	MVA	ambulance	x			x	x			x		x	
20	MVA	drive/halk up	x			x	x			x		x	
21	Resp Distress	ambulance	x			x	x			x		x	
22	Resp Distress	drive/halk up	x			x	x			x		x	
23	Bone or joint injury	ambulance		x		x		x			x		x
24	Bone or joint injury	drive/halk up		x		x		x			x		x
25	Chest pain	drive/halk up		x		x		x			x		x
26	Fever	ambulance		x		x		x			x		x
27	Fever	drive/halk up		x		x		x			x		x
28	Laceration	ambulance		x		x		x			x		x
29	Laceration	drive/halk up		x		x		x			x		x
30	MVA	ambulance		x		x		x			x		x
31	MVA	drive/halk up		x		x		x			x		x
32	Resp Distress	ambulance		x		x		x			x		x
33	Resp Distress	drive/halk up		x		x		x			x		x
34	Chest pain	ambulance			x		x				x		x

Process Flow Chart-Exercise

- Use Post-It® Notes to create a detailed flow chart for completing a tax return
- Use a Flip Chart or tear off paper
- Start with the 5-7 steps you created for the SIPOC
- Don't put in any lines until you are all done.
- TIMING: 15 minutes


VA/NVA Analysis-Exercise

- Mark steps on your process map as:
 - Value-Adding (VA) in Green
 - Business-Enabling (BE) in Black
 - Non-Value-Adding (NVA) in Red
- Use the following criteria for VA:
 - Transforms the item or service toward completion
 - Customer would be willing to pay for it
 - Done right the first time (i.e. not rework of upstream errors)
- TIMING: 20 minutes

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Brainstorming (Anti-solution)-Exercise

- Objective: **How can we make the process of completing a tax return easier**
- TIMING:
 - 5 minutes for "anti" list
 - 5 minutes to reverse the anti's




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5 S's-Exercise

- List on a Flip Chart the steps in the process for completing a tax return where the 5 S's could be applied
- Brainstorm ideas for applying the 5 S's to the list you developed
 - Balance the timing of work
 - Minimize motion and transportation
 - Organize, streamline, and label tools & supplies
 - Identify cross-training requirements
- Vote for favorite idea (N/3)
- Report: Person wearing most colors will tell the group the 3 top vote getters
- TIMING:
 - 2 minutes for list
 - 5 minutes for 5 S list
 - 1 minute to vote for favorite




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Poka Yoke (Mistake Proofing)-Group Exercise

- Child-proof caps
- ATM Beeping if cash or card remains
- Bars on parking garages to limit height of vehicles
- Pre-dosed medications
- Mirrors on walls/ceilings to see around corners
- Traffic Signals to enter a highway
- Flashing lights on highway to alert cars to a red light around a bend
- **How could we Poka Yoke the tax return process?**



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Brainstorming (Anti-solution)-Exercise

- Objective: How can we make the process of completing a tax return easier
- TIMING:
 - 5 minutes for “anti” list
 - 5 minutes to reverse the anti’s

5 S’s-Exercise

- List on a Flip Chart the steps in the process for completing a tax return where the 5 S’s could be applied
- Brainstorm ideas for applying the 5 S’s to the list you developed
 - Balance the timing of work
 - Minimize motion and transportation
 - Organize, streamline, and label tools & supplies
 - Identify cross-training requirements
- Vote for favorite idea (N/3)
- Report: Person wearing most colors will tell the group the 3 top vote getters
- TIMING:
 - 2 minutes for list
 - 5 minutes for 5 S list
 - 1 minute to vote for favorite


Poka Yoke (Mistake Proofing)-Group Exercise

- Child-proof caps
- ATM Beeping if cash or card remains
- Bars on parking garages to limit height of vehicles
- Pre-dosed medications
- Mirrors on walls/ceilings to see around corners
- Traffic Signals to enter a highway
- Flashing lights on highway to alert cars to a red light around a bend
- How could we Poka Yoke the tax return process?

Slide 30

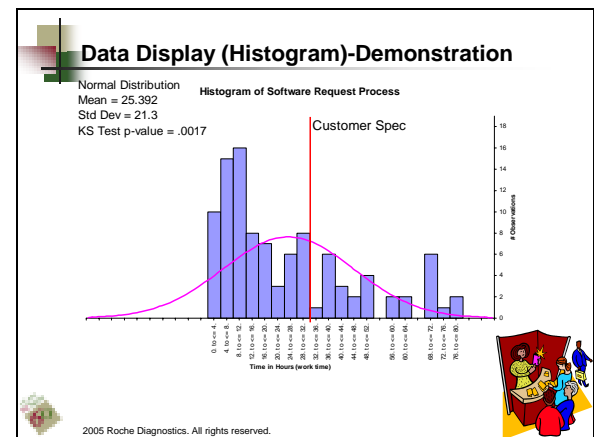
Tree Diagram (CTQ Tree)-Exercise

- Customer Need: An easy, accessible, fast way to get software they need.
- Use the Tree Diagram to drill down and elaborate on basic customer need
- Vote for needs you care about the most
- **Save your results for later!**
- TIMING:
 - 15 minutes to develop Tree
 - 5 minutes to vote



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SIPOC-Exercise

- Create a SIPOC for the software request process
- Try to do the "P" first
 - First step: Identify need for software
 - Last step: Install software
- Complete other columns in this suggested order:
 - Output(s) (nouns)
 - Customer(s) (personal nouns)
 - Inputs(s) (nouns)
 - Supplier(s) (personal nouns)
- TIMING: 15 minutes



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Scenario 2

The second scenario is the time to request software. Although I haven't heard this is a problem, it is an excellent example for our purposes.

I extend apologies to those working hard on keeping this process working smoothly and hope they will allow us to impugn their process for the good of training!

Tree Diagram (CTQ Tree)-Exercise

- **Customer Need:** An easy, accessible, fast way to get software they need.
- Use the Tree Diagram to drill down and elaborate on basic customer need
- Vote for needs you care about the most
- **Save your results for later!**
- **TIMING:**
 - 15 minutes to develop Tree
 - 5 minutes to vote

SIPOC-Exercise

- Create a SIPOC for the software request process
- Try to do the "P" first
 - First step: Identify need for software
 - Last step: Install software
- Complete other columns in this suggested order:
 - Output(s) (nouns)
 - Customer(s) (personal nouns)
 - Inputs(s) (nouns)
 - Supplier(s) (personal nouns)
- **TIMING:** 15 minutes

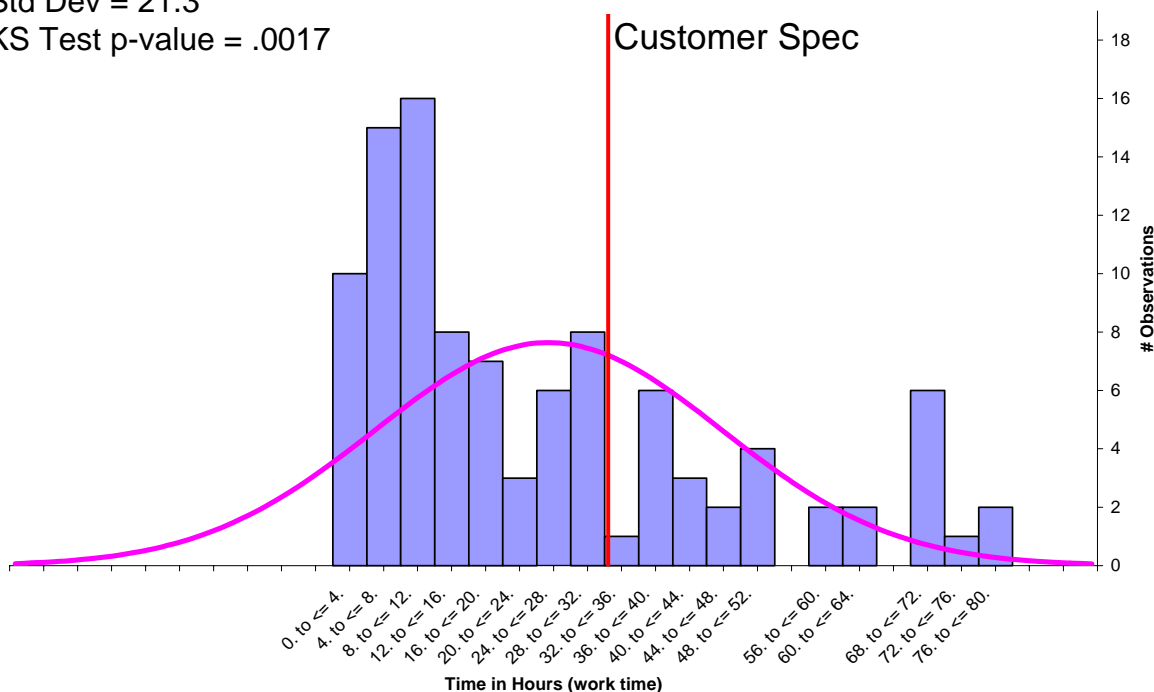
For a copy of this tool, visit the Six Sigma web site.

Data Display (Histogram)-Demonstration

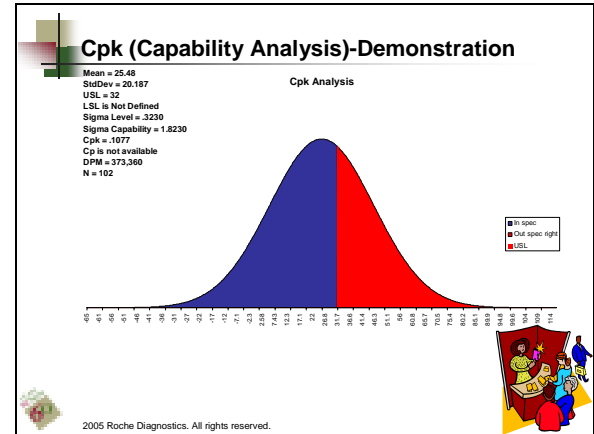
The histogram below displays time data for the fictitious software request process initiative. The data is skewed to the left but still shows that the variability is high. It also shows that many requests are not meeting the customer spec of 32 hours. To better see how well the process is meeting customer needs, look at the Cpk chart on page 15.

Normal Distribution
 Mean = 25.392
 Std Dev = 21.3
 KS Test p-value = .0017

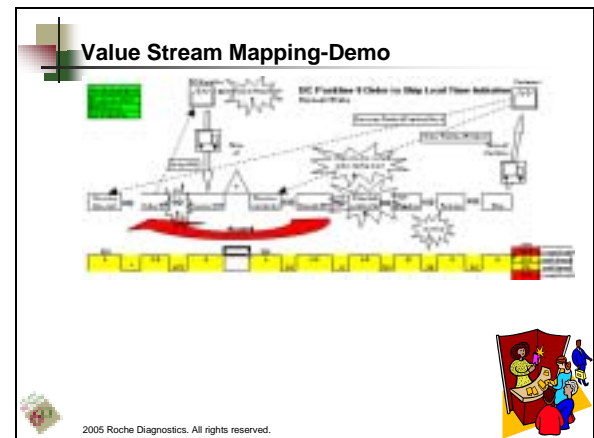
Histogram of Software Request Process



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Deployment Flow Chart-Exercise

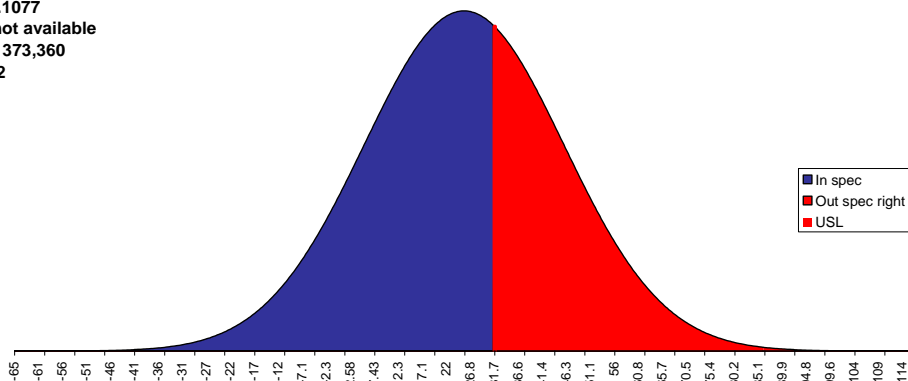
- Using your SIPOC as a starting point and more Post-Its, quickly fill in the detail of your process map
- Identify the people/dept/etc. that perform the steps of the process (lane labels)
- Create columns for the lanes on a Flip Chart
- Arrange the Post-Its in the appropriate swim lanes to show the flow of the process and how it travels from lane to lane

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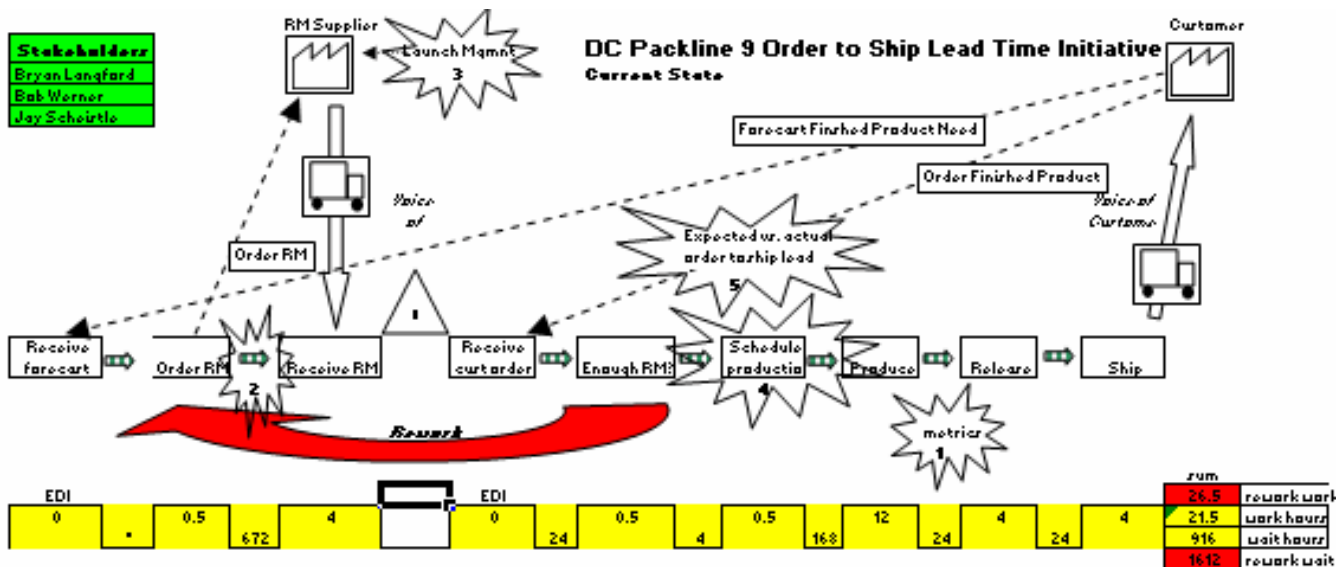
Cpk (Capability Analysis)-Demonstration

Mean = 25.48
 StdDev = 20.187
 USL = 32
 LSL is Not Defined
 Sigma Level = .3230
 Sigma Capability = 1.8230
 Cpk = .1077
 Cp is not available
 DPM = 373,360
 N = 102

Cpk Analysis



Value Stream Mapping-Demonstration



These symbols will soon be available on the Six Sigma web site for both Excel® and Visio®. If the symbols can't be located, contact the Six Sigma department at x1-3332.

Deployment Flow Chart-Exercise


- Using your SIPOC as a starting point and more Post-Its, quickly fill in the detail of your process map
- Identify the people/dept/etc. that perform the steps of the process (lane labels)
- Create columns for the lanes on a Flip Chart
- Arrange the Post-Its in the appropriate swim lanes to show the flow of the process and how it travels from lane to lane

This tool can be created manually, as in class, or using software: Excel or Visio.

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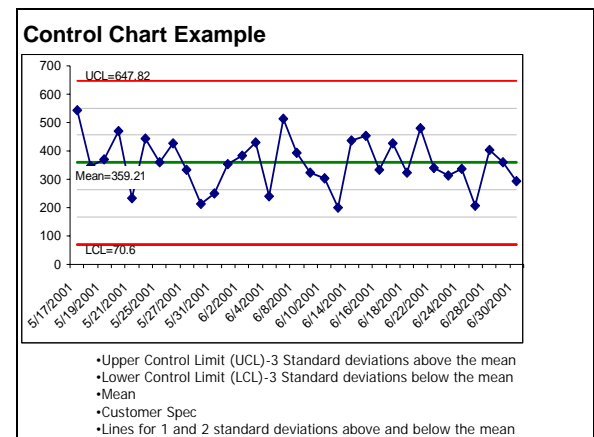
Control Chart-Exercise

- Using a Flip Chart and the data provided, create a Control Chart
- Label the following parts of your Control Chart:
 - Upper Control Limit (UCL)-3 Standard deviations above the mean
 - Lower Control Limit (LCL)-3 Standard deviations below the mean
 - Mean
 - Customer Spec
 - Lines for 1 and 2 standard deviations above and below the mean



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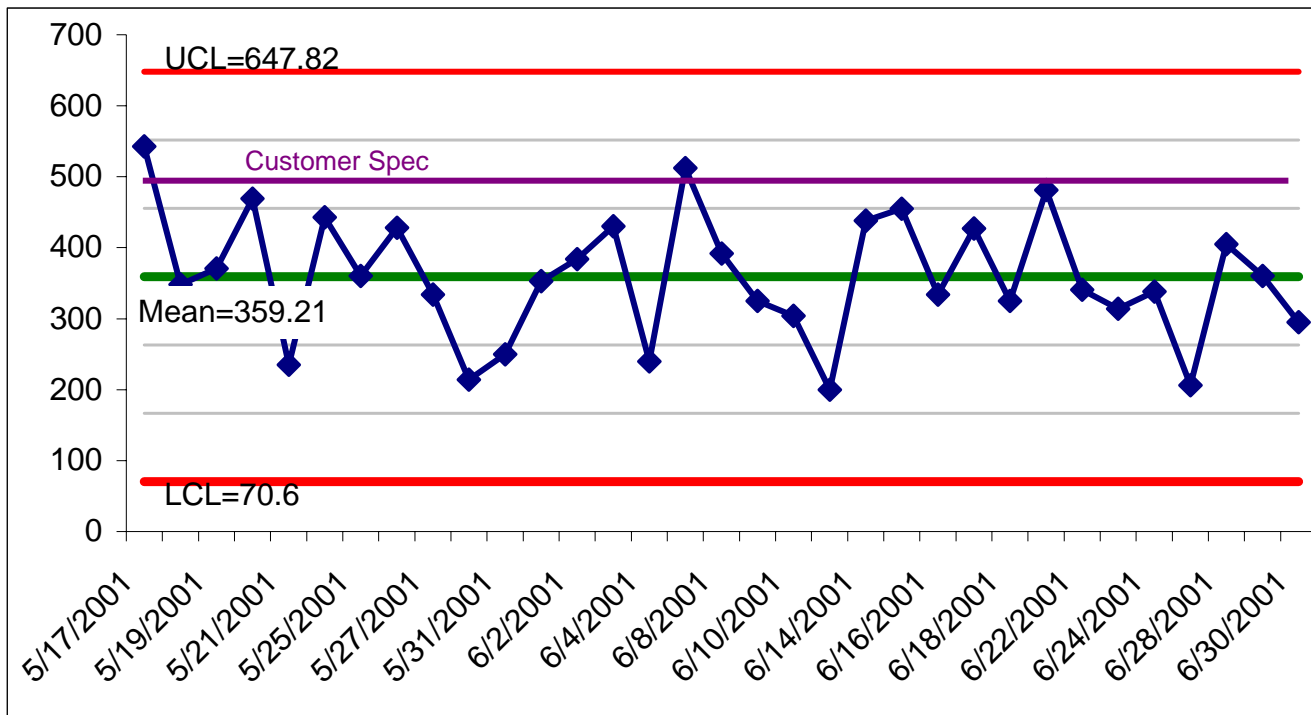
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Control Chart-Exercise

- Using a Flip Chart and the data provided, create a Control Chart
- Label the following parts of your Control Chart:
 - Upper Control Limit (UCL)-3 Standard deviations above the mean
 - Lower Control Limit (LCL)-3 Standard deviations below the mean
 - Mean
 - Customer Spec
 - Lines for 1 and 2 standard deviations above and below the mean


Control Chart Example



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Brainstorming (Object Analogy)-Group Exercise

- Objective: **How can we make the process for requesting software faster**
- TIMING:
 - 5 minutes for object list
 - 5 minutes to generate real ideas
 - 10 minutes to vote for 3 favorites



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Prioritization Matrix (X-Y Matrix)-Exercise

- You will rate the top 3 solution ideas from the object brainstorming against the top 4 customer requirements from the Tree Diagrams.
- See your handout for details.
- **TIMING:** 18 minutes

Input Variables (X's)	Output Variables (Y's)	
	Output Ranking	Output Ranking
Coffee Type	10	10
Amt. of Coffee	9	7
Grind Time	9	6
Water Temp.	9	3

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Kaizen Blitz

Every blitz is different and tailored to the problem. Many of the tools discussed in this course may be used and in a very different order and different ways than for an initiative.

Brainstorming (Object Analogy)-Group Exercise

- Objective: How can we make the process for requesting software faster
- TIMING:
 - 5 minutes for object list
 - 5 minutes to generate real ideas
 - 10 minutes to vote for 3 favorites

Prioritization Matrix (X-Y Matrix)-Exercise

You will rate the top 3 solution ideas from the object brainstorming against the top 4 customer requirements from the Tree Diagrams.

- Look at the Tree Diagram created earlier (see page 13 for instructions).
- Identify the 4 customer requirements that received the most votes.
- Enter them on the X-Y matrix provided next to: **Output Variables (Y's): Customer Requirements.**
- Quickly rate them using a scale of 1-10 where 10 is highest. You can use the number of votes as a guide. Enter next to **Output Ranking.**
- Enter the top 3 solution ideas from the brainstorming we just did on the X-Y matrix under **Input Variables (X's): Solutions** (vertical).
- For each solution along the side, rate it a 1 (low), 3 (medium), or 10 (high) against how well the solution addresses each customer need across the top. Don't debate; it's just an exercise!
- Multiply each rating by the **Output Ranking** and then sum for the row.
- Which solution had the highest score.

For a copy of this tool, visit the Six Sigma web site.

Project: Coffee

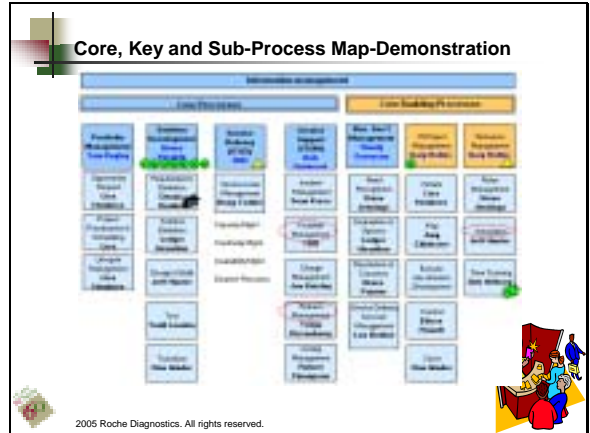
Date: 12/8/1996

- DEMO
- View Results
- Delete
- Instructions

		1	2	3	4	5	6
Output Variables (Y's)		/					
		Taste	Aroma	Price	Acidity		
Output Ranking		10	10	10	2		

Input Variables (X's)		Association Table					
1	Coffee Type	10	10	10	10		
2	Amt. of Coffee	9	7	10	10		
3	Grind Time	9	6	2	3		
4	Water Temp.	9	3	2	2		
5	Cup Type	2	4	4	2		
6	Cup Size	2	4	5	1		
7	Brew Time	9	6	2	2		

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Spaghetti Diagram-Demonstration

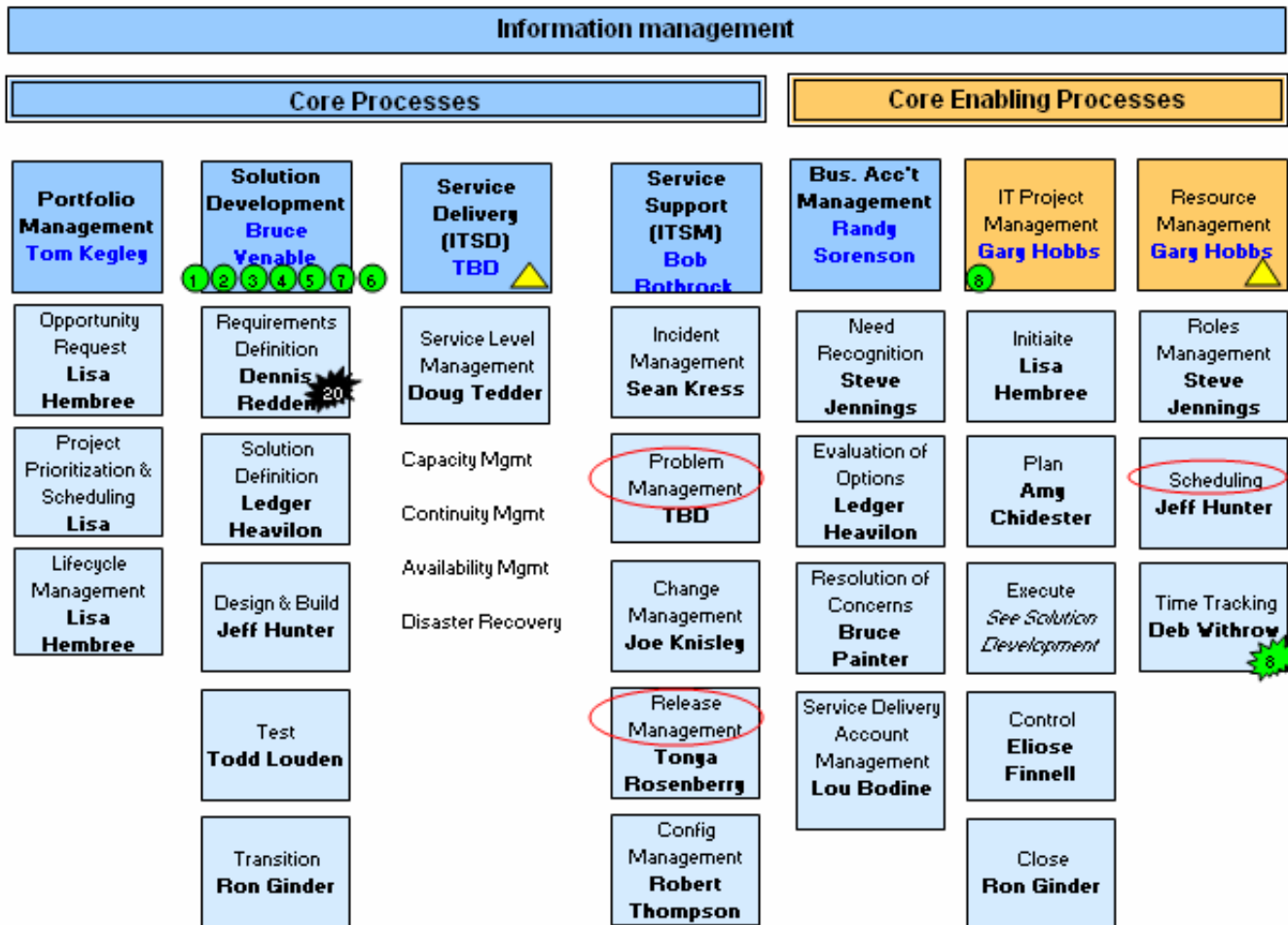
The spaghetti diagram is used to trace the path of work. The path may be walking, reaching, or even clicking/mouse moves on a computer screen.

Below is a general example of a spaghetti diagram.



Core, Key and Sub-Process Map-Demonstration


Below you will see part of the most current Business Process Map for IT.



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LEAN Six Sigma Yellow Belt for IT- Wrap up & References

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“No problem can be solved from the same consciousness that created it.”

- Einstein



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Resources for Further Exploration

- Books
 - The Six Sigma Way
 - Six Sigma: The Breakthrough Management Strategy Revolutionizing the World's Top Corporations
 - Implementing Six Sigma
 - LEAN Thinking: Banish Waste and Create Wealth in Your Corporation
- Internet Websites
 - www.ISSSP.com (International Society of Six Sigma Professionals)
 - www.isixsigma.com

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Six Sigma Yellow Belt Learning Objectives

The Information Technology people should now be able to:

- List the 4 points of the LEAN Six Sigma philosophy
- List the phases in a LEAN Six Sigma initiative

...after referring to this handout. They should also be able to:

- Describe the purpose of the LEAN Six Sigma tools
- Contribute in meetings utilizing LEAN Six Sigma tools

...after consulting the reference guide created in this course.

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Resources for Further Exploration

Books

- **The Six Sigma Way: How GE, Motorola, and Other Top Companies are Honing Their Performance** by Peter S. Pande, Robert P. Neuman, Roland R. Cavanagh - excellent book detailing step-by-step instructions regarding implementation. Easy to understand without too much detail on complex statistical theory. 422 pages.
- **Six Sigma: The Breakthrough Management Strategy Revolutionizing the World's Top Corporations** by Mikel Harry and Richard Schroeder - good book but reads more like a text book with a focus more on theory than implementation. 300 pages.
- **Implementing Six Sigma: Smarter Solutions Using Statistical Methods** by Forrest W. Breyfogle III - purely a reference manual and extremely detailed primarily useful to already trained individuals. 790 pages.
- **LEAN Thinking: Banish Waste and Create Wealth in Your Corporation** by Womack

Internet Websites

- www.ISSSP.com (International Society of Six Sigma Professionals) - free membership, offers webcast conferences every week (1 hour) and informative articles. Very good.
- www.isixsigma.com - provides articles, tools, news, and resources regarding six sigma. Good-fair

Six Sigma Yellow Belt Learning Objectives-Did we meet them?

The Information Technology people should now be able to:

- List the 4 points of the LEAN Six Sigma philosophy
- List the phases in a LEAN Six Sigma initiative

...after referring to this handout. They should also be able to:

- Describe the purpose of the LEAN Six Sigma tools
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