



California State
University

Division Of
**FINANCE &
ADMINISTRATION**

C H A N N E L
I S L A N D S

LEAN – Continuous Improvement Toolkit



We acknowledge and appreciate the development of these resources by staff from UW Finance and Facilities Strategy Management: Cheryl Hawley, Dan Druliner, David Wright, Jeanne Semura, and Ray Hsu.



Continuous Improvement Toolkit

Idea Generation Tools	Project Management Tools	Data Gathering Tools	Data Display Tools	Data Analysis Tools
Brainstorming & Green-lighting	Consideration & Constraints Worksheet	Affinity Diagram	Affinity Diagram	Cause & Effect Diagrams (Fishbone)
Delphi Technique	Implementation / Communication Plan	Check Sheets	Control Charts	Plus-Minus-Interesting
Multi-voting	Project Progress Checklist	Surveys	Flowcharts	Decision/Solution Matrix
	Charter	Benefits and Practicability Analysis	Histograms	
	Project Lifecycle	Comparison Matrix	Pareto Graphs	
			Run Charts (Trend Charts)	

Lean Continuous Improvement Toolkit

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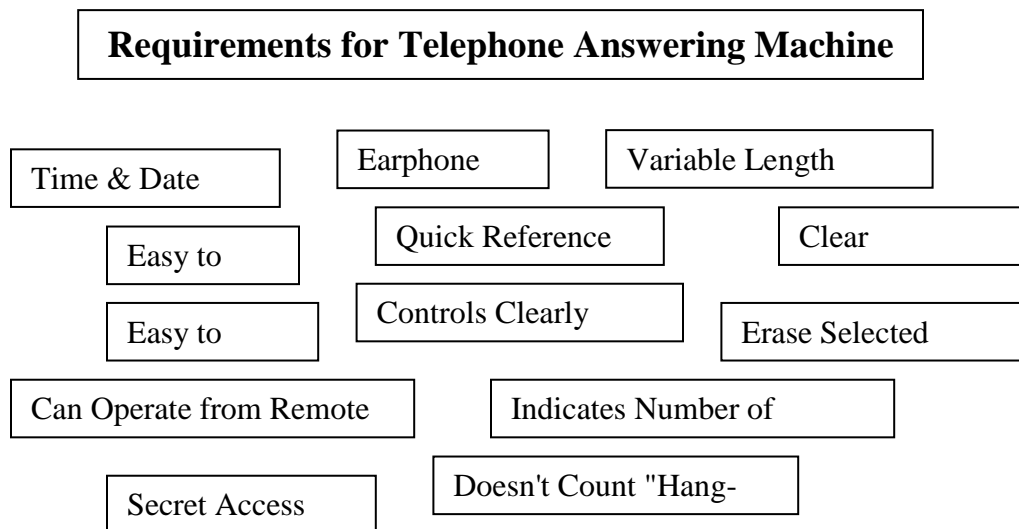
Affinity Diagrams

Primary Application

- Use to add structure to a large or complicated issue - such as customer needs
- Break down a complicated issue into easy to understand categories
- Gain agreement on an issue or situation

Steps to Constructing

1. State the issue or problem to be worked on
2. Generate ideas for the issue in question & write on a card or sticky note
3. Collect the cards or sticky notes
4. Arrange the cards or sticky notes into related groups
5. Create a title or heading for each group - short 1 to 3 words that describe the main theme or focus of group it represents



FEATURE

Variable Length Messages
Time & Date Stamp
Doesn't Count "Hang-Ups"
Indicates Number of Messages

Secret Access Code
Earphone Jack

Clear Instructions
Quick Reference Card

Controls Clearly Marked
Easy to Use
Can Operate from Remote Phone

Easy to Erase
Erase Selected Messages

CATEGORY

INCOMING MESSAGES

PRIVACY

INSTRUCTIONS

CONTROLS

ERASING

Benefit and Practicability Analysis

The Benefit and Practicability Analysis is a tool that is used to prioritize a list of processes or problems that need improvement by ranking them on their:

- Potential Benefit
- Practicability of Change

PRIORITY ASSESSMENT

BENEFIT	PRACTICABILITY
1. Little or No Benefit	1. Difficult or Impossible
2. Moderate Benefit	2. Moderate Effort
3. Considerable Benefit	3. Easy to Implement

Assessment (Benefit & Practicability)	Priority
3, 3	No.1
3, 2	No.2
2, 3	No.3
2, 2	No.4

EXAMPLES

Benefit

- * Time savings
- * Cost savings
- * Effect on morale
- * Safety improvement
- * Number of beneficiaries

Practicability

- * Complexity of investigation
- * Number of decision makers
- * Time to implement
- * Measurability
- * Resource needs

Brainstorming & Green-lighting

Brainstorming

This tool is used to ensure the group has explored a broad range of options before a decision is made. Individuals are encouraged to express all possible solutions, even if they seem silly at the time. No discussion, judgment or criticism of ideas is done during the brainstorm. Following the brainstorm session, discussion and/or critique of the proposed ideas can be done.

Advantages: Allows and encourages all group members to participate in the solution. Encourages creative thinking. Often raises viable considerations or solutions that may have been otherwise withheld as potentially risky or silly.

Disadvantages: It can prove difficult to stick to the original issue or problem when suggested solutions become broad ranging and creative, but unrealistic or incongruous with the problem at hand.

Also it's important to remember that not all people are comfortable with such a rapid, open style of communicating ideas. Allow space and opportunity, whenever possible, for those individuals who might have good ideas but are more cautious of speaking out in group settings.

Guidelines for Brainstorming:

- State the objective clearly and list any known constraints
- No criticism, evaluation, or discussion when ideas are suggested
- Don't let session be dominated by a few
 - Contribute ideas in rotation
 - One idea per turn
 - Okay to 'pass'
- Record all ideas
- Leader and facilitator should remain neutral
 - Draw people out without insulting or intimidating
 - Energize the group
 - Encourage and compliment the group

Green-Lighting – Structured Brainstorming

Green-lighting is a structured form of brainstorming. The goal is to generate a large number of ideas within a short time. Everyone is encouraged to participate, so by structuring the format it prevents a few individuals from dominating the discussion.

Rules for Green-Lighting

- Each person, in turn, gives one idea only
- It is OK to pass
- No questions or comments are allowed
- Decide in advance how many times to go around the group
 - Small groups – continue around until one complete turn has occurred with no new ideas
 - Large groups – go around group two or three times
- Ask clarifying questions (only the contributor of the idea may answer)

Cause & Effect Diagram (Fishbone)

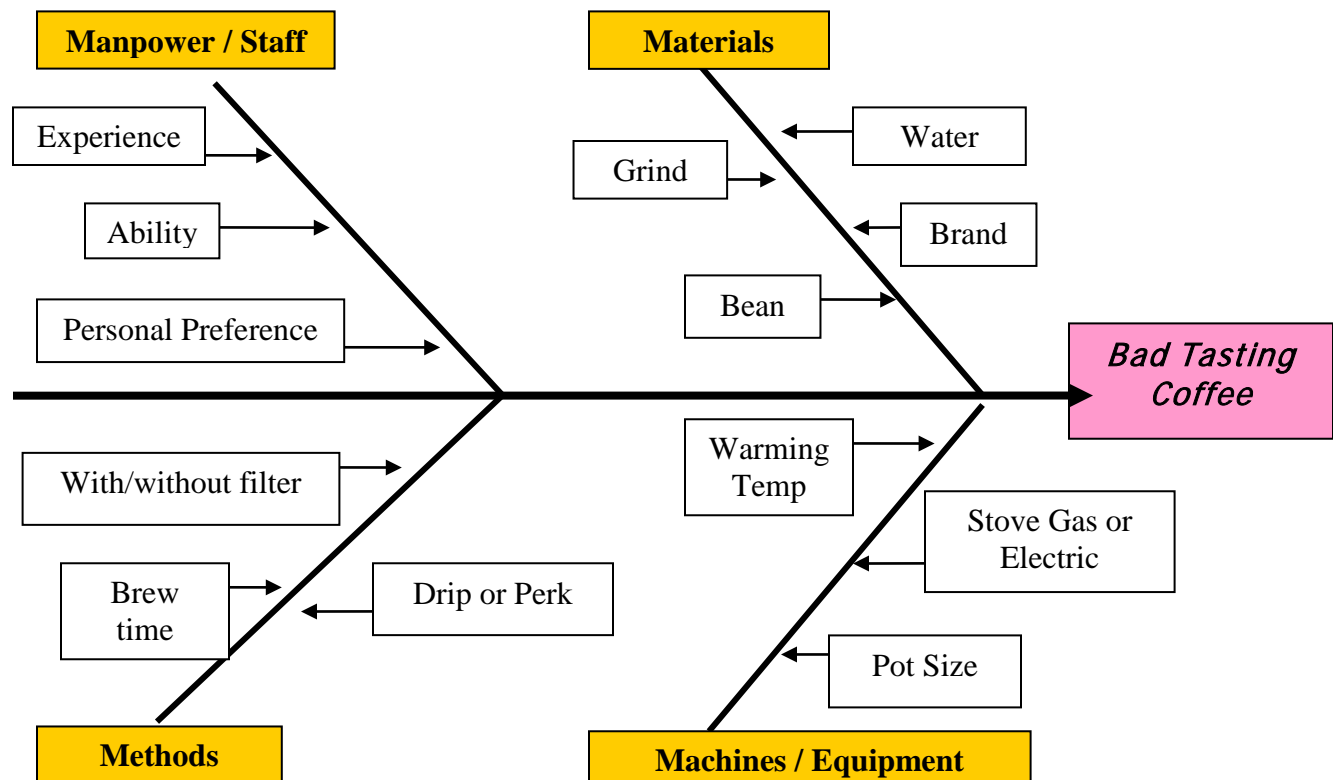
Cause & effect diagrams are sometimes called 'fishbone' diagrams. They are drawn to clearly illustrate the various causes affecting a process by sorting out and relating them. The purpose of a cause & effect diagram is to separate true causes from symptoms and to sort out major causes so that problems can be prevented from recurring.

Primary Application

- To improve process quality
- To assess conformance to customer requirements
- To visually display the relationship between a given effect and its potential causes
- To isolate different causes

Steps to Constructing

1. Define the problem or effect
2. Define the major categories of possible causes (manpower, materials, methods, machines)
3. Construct the diagram, defining the problem or effect in a box and positioning major categories as 'feeders'
4. Brainstorm possible causes within categories
5. Ask questions such as 'what are the machine issues affecting / causing...'; 'why is this happening'
6. Analyze each cause to focus on more specific causes
7. Look for items that appear in more than one category – these tend to be more likely causes
8. Identify likely and actionable root causes



Checksheets

Checksheets are simple forms used to gather data to answer the question: "How often are certain events occurring?"

Primary Application

- Use to improve process quality
- Use as a template for collecting and recording data
- Promotes consistency of comparing data

Steps to Constructing

1. Establish purpose for collecting data
2. Identify categories / data to collect
3. Brainstorm factors affecting categories
4. Determine time period for data collection
5. Determine how data will be analyzed
6. Construct a table for recording data

Problem: Complaints about Coffee			
<i>Date</i>	<i>Cold</i>	<i>Bitter</i>	<i>Weak</i>
3/1/01			
3/2/01			
3/3/01			
3/4/01			
3/5/01			
3/6/01			
3/7/01			
3/8/01			
3/9/01			
3/10/01			

Comparison Matrix

The Comparison Matrix helps to make a single decision from a multitude of choices. The decision is arrived at by means of direct comparisons between all the options.

Suppose you have to choose between 6 items...

Step 1: List the choices randomly as A, B, C, D, E, F

Step 2: Create a triangle matrix of squares

A, B, C, D, E is assigned to the vertical axis. Omit the last item - "F"

List the same options in reverse order along the horizontal axis, and leave out the first item: F, E, D, C, B

Step 3: Choose between the intersecting options. For example, would you prefer "A" or "F"? If "F," put that option in the intersecting box

	F	E	D	C	B
A					
B					
C					
D					
E					

Step 4: Prepare a Ranking Table showing the options that were assessed

Step 5: In the second column, record the total number of times that each alternative appears in the matrix

Step 6: In the third column, note the final ranking

Alternative	Total Frequency	Ranking
A	1	5
B	1	6
C	3	3
D	4	1
E	2	4
F	4	2

Note: The outcome of this technique indicates everyone's preferences. It does not indicate an objective value.

Adopted from "Continuous Improvement for Professional Services"
1994 Clive Shearer

Example Comparison Matrix

Our Vacation Choices

1. Hawaii
2. Mexico
3. Oregon
4. Whistler
5. Texas

	<i>Group Vacation to Hawaii</i>	<i>Group Vacation to Mexico</i>	<i>Group Vacation to Oregon</i>	<i>Group Vacation to Whistler</i>	<i>Group Vacation to Texas</i>
<i>to Seattle</i>	Hawaii	Mexico	Oregon	Whistler	Texas
<i>to Texas</i>	Hawaii	Mexico	Texas	Whistler	
<i>to Whistler</i>	Whistler	Whistler	Whistler		
<i>to Oregon</i>	Hawaii	Mexico			
<i>to Mexico</i>	Hawaii				

Example Ranking from Matrix

Alternative	Frequency	Ranking
Group Vacation to Whistler	5	1
Group Vacation to Hawaii	4	2
Group Vacation to Mexico	3	3
Group Vacation to Texas	2	4
Group Vacation to Oregon	1	5
Group Vacation to Seattle	0	6

Strategic Initiative Charter

July 18 - December 11, 2006

Name of Initiative:

Accounts Payable Customer Service Improvement Project

What is this Initiative?

The Accounts Payable Customer Service Improvement Team is a University-wide committee. Our goal is to identify opportunities for customer service improvement in the short term and to make recommendations for long term solutions.

Initiative Owner

Name	Title	Phone	E-mail
Owner	Financial Services Director	999-999-9999	owner_email@u.washington.edu

What is the Problem/Opportunity?

With an understanding of the Accounts Payable process, the team will hold several focus group sessions throughout the summer in the FOCUS group model to identify what our customers need and would like to see improved. Our goals are as follows:

- Identify who to include in our focus groups
- Identify what information we need from our focus groups
- Establish a listing of improvements
- Implement type 1 improvements
- Track and communicate type 2 improvements

Problem Statement:

The Financial Management 2006 Customer Survey provided feedback that the Accounts Payable team needs to achieve significant improvements to the level of customer service provided to UW campus and other customers. The AP team can learn directly from customers by engaging them in a USER-model process improvement initiative to identify and implement improvements to the AP process to achieve excellence in customer service.

Gaps:

- Transaction tracking in heritage system (PAS) is minimal
- Communications and information exchange mechanisms between AP and campus are inadequate
- AP Customer service is not consistent
- PAS system will not be replaced with user-friendly technology in near future

Work done so far:

- Review of specific problems identified by the customer survey (Spring 2006)
- Communication plan initiated (FM Newsletter May 2006)
- Rapid Process Improvement initiatives by AP Teams in 2005/2006
- Identification of problem manual payment processes in AP (Summer 2006)
- Initial Six Sigma pilot analysis of online invoice payment (June 2006)

Purpose

The Accounts Payable Customer Service Improvement team was formed in the summer of 2006 following a customer survey in 2005 that revealed we could improve the level of customer service we provide.

Core Team Expectations:

- Broad representation of the University
- Question current processes and structures
- Identify new and revised service and support mechanisms
- Prioritize and evaluate stakeholder feedback
- Participate in decision-making
- Advocate and communicate goals of project
- Perform at high level as a team

Project Team Role:

- Members are comprised of subject matter, technical and functional experts
- Assume responsibility for high-quality, timely project deliverables as assigned
- Coordinate efforts between the tasks to address potential related impacts
- Assess risk, and define approaches for payment process improvement
- Meet project objectives and timeline
- Participate implementation of deliverables
- Initial team meeting will focus on team-building and planning
- Participation is critical
- Data-driven analysis

Project Team Leaders: [Name]

- Plan, facilitate, and document Sponsor meetings
- Facilitate and direct the Project Team
- Plan and coordinate communications with executives, users and stakeholders
- Ensure user readiness and sequencing for implementations
- Manage development of business processes, policies, and procedures
- Approve project action and communication plans
- Manage and communicate payment process concerns and escalate issues to the project sponsors, executive sponsor and key stakeholders

Project Manager: [Name]

- Plan and document all meetings of the Core Project
- Communicate with and document sub-project teams, as needed
- Develop and manage the project action and communication plans and ensure that all plans are integrated for timelines.
- Draft presentation and reporting materials
- Draft policies, procedures and other deliverables as needed and appropriate
- Develop and manage issues list
- Monitor timelines
- Manage and communicate risk factors
- Manage standards for project methodology and documentation
- Work closely with the Project Team on all issues, using a single action plan and parking lot issue tracking system

Executive Sponsors:

- Provide guidance and facilitate issues when sponsors or stakeholders have competing demands
- Hold project sponsors and project leadership accountable to the timelines, external approvals and agreed approaches to the project implementation
- Ensure that all the senior and other stakeholders are kept informed of the project issues
- Advocate for the project
- Provide executive oversight to the project to clarify business requirements, confirm timelines and implementation approaches
- Review project progress on a regular basis
- Clarify policy and address escalated practice and implementation issues, including issues between internal organizations
- Escalate any issues that threaten to jeopardize the success of the project to a higher executive level when necessary
- Secure/approve any resources required for the project
- Provide support for implementation by ensuring cooperation and execution of project tasks assigned to staff and others
- Make decisions based on Project Team recommendations

Stakeholders:

- This project will require support and alignment of key stakeholders throughout the UW. Although not involved in the day-to-day project design and implementation, each major decision and milestone will be reviewed and acknowledged by these stakeholders.
- Participate in issue identification and prioritization
- Provide feedback to project team as requested
- Participate in periodic review sessions, as appropriate
- Review decisions and deliverables for impact, risk mitigation and compliance with business needs

Boundaries/Scope

- Short term improvements

Major Categories of Customers

- Campus Customers
- External Customers (vendors)
- Process Partners

Strategic Alignment

- Process Improvements

Measures of Success

- Survey measures now (10/06) and in 6 months (04/06)

Membership

Name	Title	Phone	E-mail
Name	Title	999-999-9999	email@u.washington.edu
Name	Title	999-999-9999	email@u.washington.edu
Name	Title	999-999-9999	email@u.washington.edu

Timeline / Milestones / Project Phases

Timeline:

Date	Plan
July 18th	KICK-OFF Meeting
July/August	Next 3 Meetings: Identify Issues Define Project Scope Gather/Analyze Data
September/October	Outreach to QRAM, A&S and SOM Admin Meetings Focus Groups
November/December	Identify Solutions
Winter 2007	Implement Solutions

Milestones:

- Sponsor Updates (10/18/06 and 12/11/06)

Project Phases:

1. Getting Ready
2. Identify Issues
3. Define Project Scope
4. Gather & Analyze Data
5. Identify Solutions
6. Implement Solutions
7. Measure & Monitor

Considerations & Constraints Worksheet

Problem:
Alignment with higher goals & objectives:
Complexity / simplicity of the problem:
Impact of the problem:
Measurability:
Who else is working on the problem:
Availability of resources (financial, technical, staff, etc):
Politics / history:
Support from higher authorities:
Control & influence the team has: <ul style="list-style-type: none">• <i>Type 1: control</i>• <i>Type 2: influence</i>• <i>Type 3: neither control nor influence</i>

Control Charts

Control charts are used to evaluate the amount and type of variation within a process. A control chart is similar to a run chart with the addition of a mean (centerline) and upper and lower control limits.

Steps to Constructing

1. Collect data
2. Plot the data points
3. Compute mean (average) of individual data points
4. Compute control limits (standard deviation)
5. Draw the mean and upper & lower control limits on the chart

Mean (centerline)

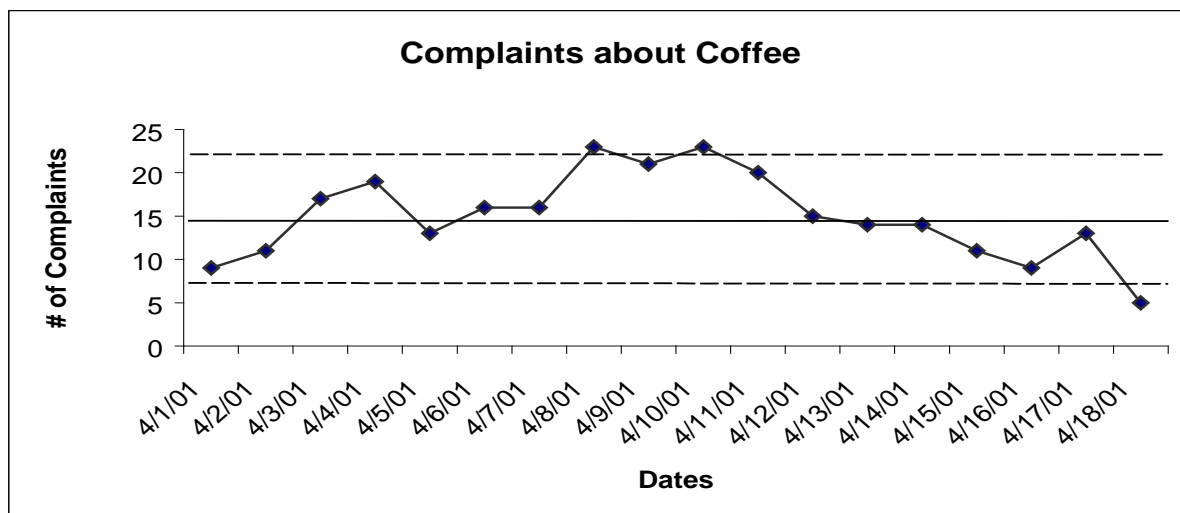
- The mean is the average of a set of data
- When added to a run chart, the mean becomes the centerline
- The centerline indicates the typical level of process performance

Control Limits

- Calculated upper and lower boundaries on common cause variations
- Can be used to determine process stability
- One or more points outside the control limits indicates special cause variation

Things to Look For

- Data points falling outside control limits
- 6 or more points in a row steadily increasing or decreasing
- 8 or more points in a row on one side of the centerline



Decision/Solution Matrix

The decision/solution matrix can be used for multiple purposes. It may be used when trying to identify what decisions or solutions are most viable, or it may be used to help select a problem to work on.

Steps to Constructing

1. Decide which criteria are important in selecting solutions and put these across the top row of the matrix
2. List the possible solutions down the left side of the matrix
3. Agree on a rating scale to use
3 = fully meets the criteria
2 = partially meets the criteria
1 = little or no connection to the criteria
4. Rate the solutions
5. Look at the results and identify which solutions best meet the criteria

	<i>Criteria Important to Solution</i>			
<i>Solutions</i>	<i>Low Cost</i>	<i>Decrease in customer complaints</i>	<i>Quick to implement</i>	<i>Staff acceptance</i>
New coffee maker	1			
Different brand of coffee		2	3	
Filtered water		2		1
Follow coffee maker directions	3		3	2
Train staff			2	2

Delphi Technique

The Delphi technique, or multi-voting, is a way to narrow the results of a brainstorming session or the causes from creation of a fishbone diagram. Delphi is an effective tool for controversial issues or when a team can't come to an agreement.

Steps to Constructing

1. Make sure everyone understands the items being voted on - discuss if necessary
2. Decide how many 'votes' each individual will have, usually no more than 6-8 or 1/4-1/3 of total items
3. Give each team member as many colored dots as the number of allowable votes
4. Tell everyone to vote for the items they think are most important – they can place multiple dots on one item
5. Tally the votes
6. Review the results and make a selection – if there are still a large number of items, go through narrowing a 2nd time voting only on top items. Use half the number of votes for the 2nd round



Flowcharts

Flowcharts are a tool for planning and analyzing processes. They allow you to break any process down into individual events or activities and to display these in shorthand form showing the logical relationships between them. Constructing flowcharts promotes better understanding of processes which is a prerequisite for improvement.


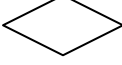
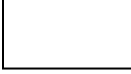


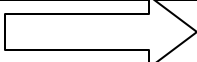
Primary Application

- To see how a process works
- To identify critical points, bottlenecks or problem areas in a process
- To see how different steps in the process are related
- To identify the 'ideal' flow of a process from start to finish
- To design a new work process

Steps to Constructing

1. Identify the process to flowchart
2. Determine beginning and ending points of the process
3. Identify major steps in the process
4. List additional steps as needed
5. Put steps in proper sequence
6. Assign appropriate symbols to each step
7. Connect steps with arrows to show the flow of the process
8. Test the flowchart to make sure all the necessary steps have been included
9. Finalize the flowchart

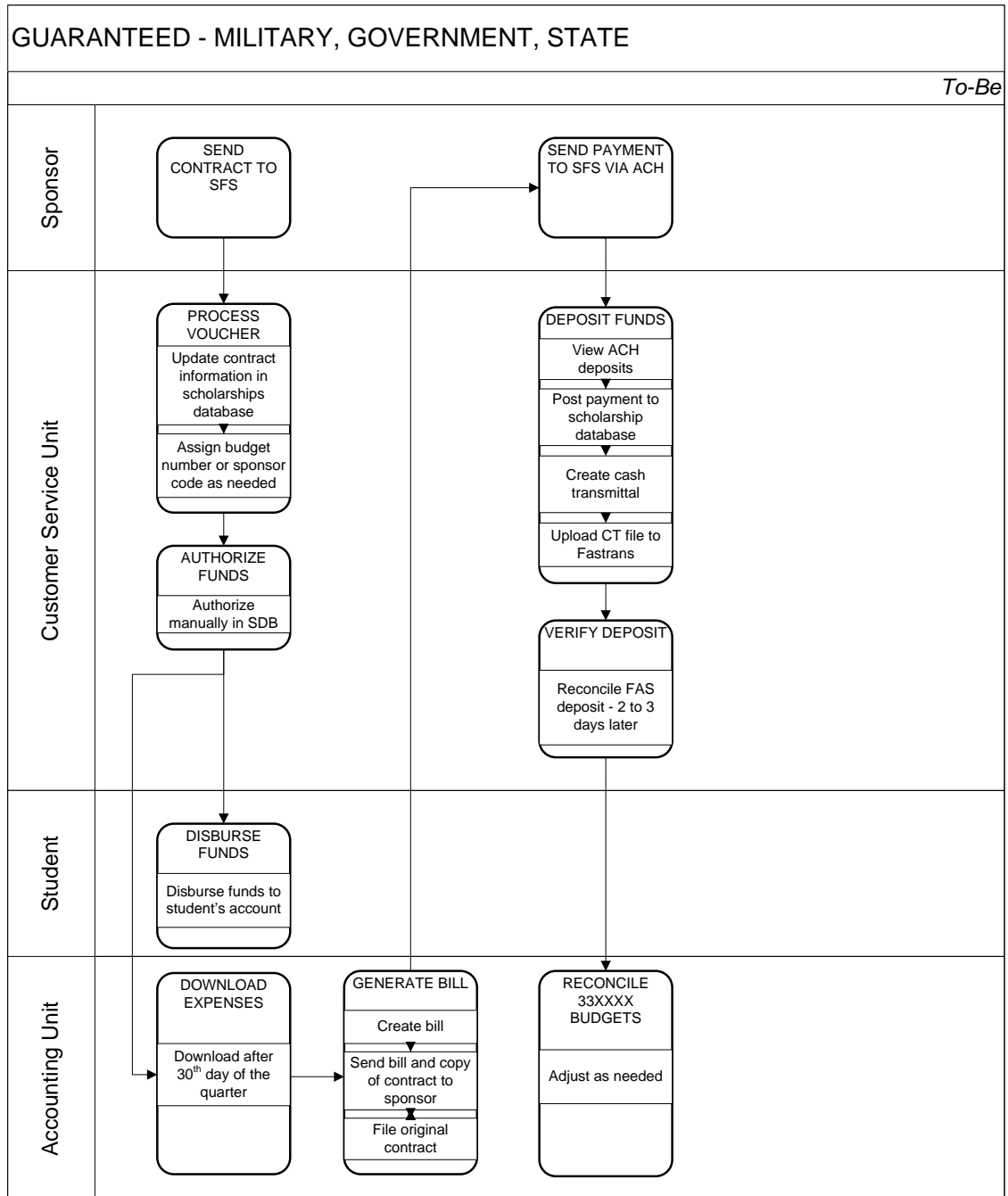
Standard Flowchart Symbols

SYMBOL	REPRESENTS	EXAMPLE
	Beginning or Ending point	Receive complaint / Complete process
	Decision Point	Yes / No Pass / Fail
	Activity	Hold a meeting Make a phone call
	Document	Report is completed Form is filled out
	Connector	Go to another page or another part of the flowchart
	Flow	Move from one activity to next

Major types of flowcharts are:

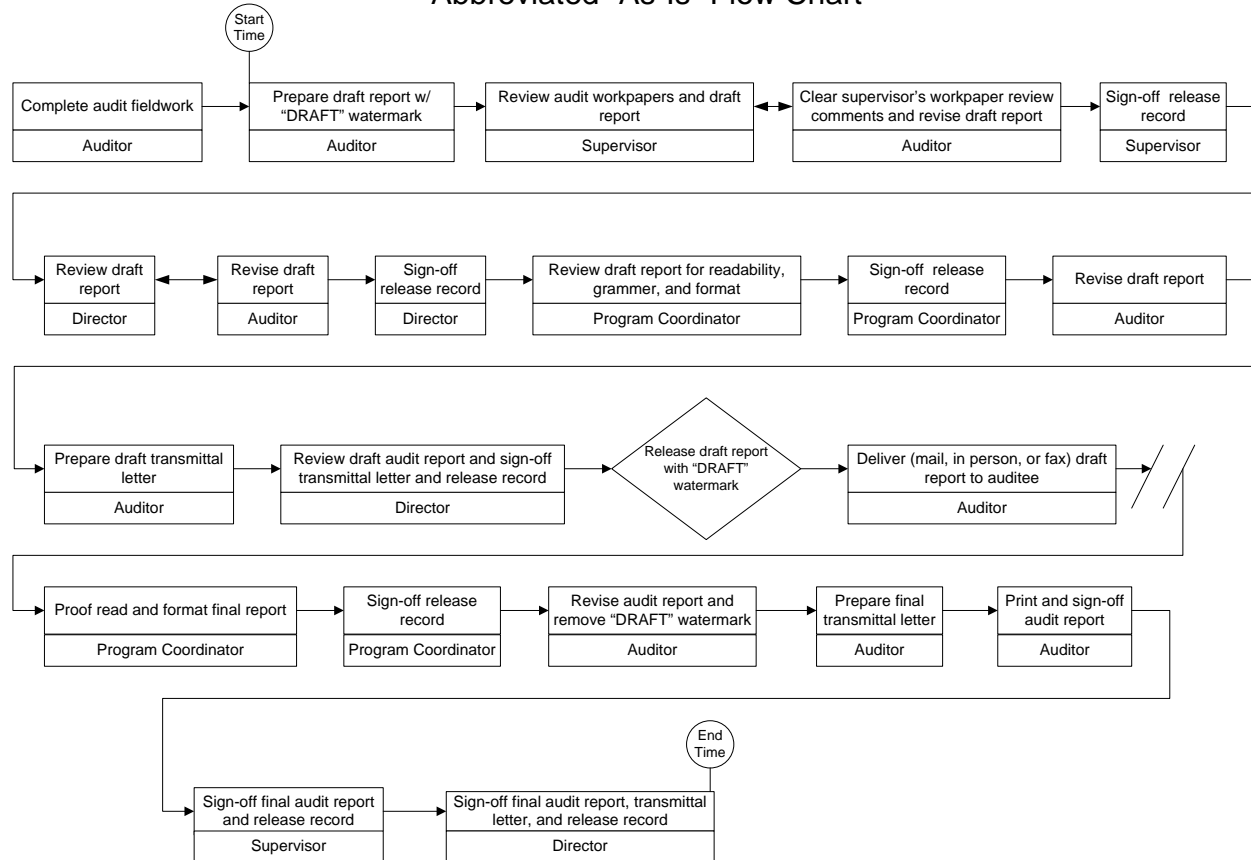
- Departmental or cross-functional
- Straight-line/horizontal
- Top down
- Vertical

Departmental or Cross-Functional Flowchart



Straight-Line Horizontal Flowchart

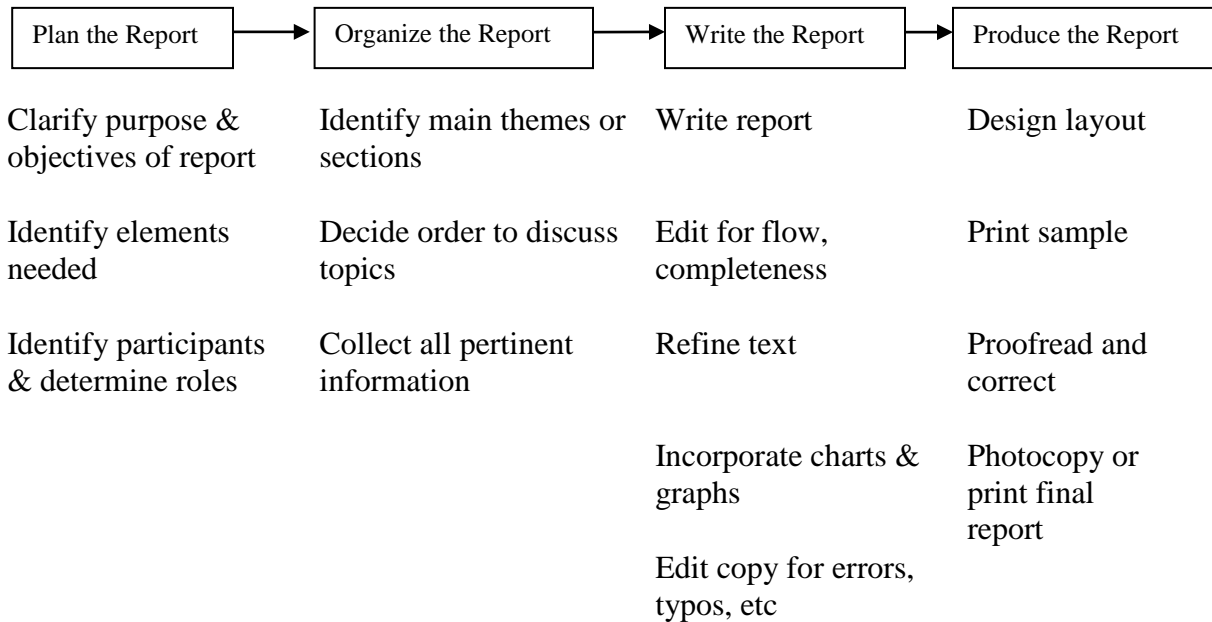
Internal Audit - Abbreviated "As-Is" Flow Chart



Top-Down Flowcharts

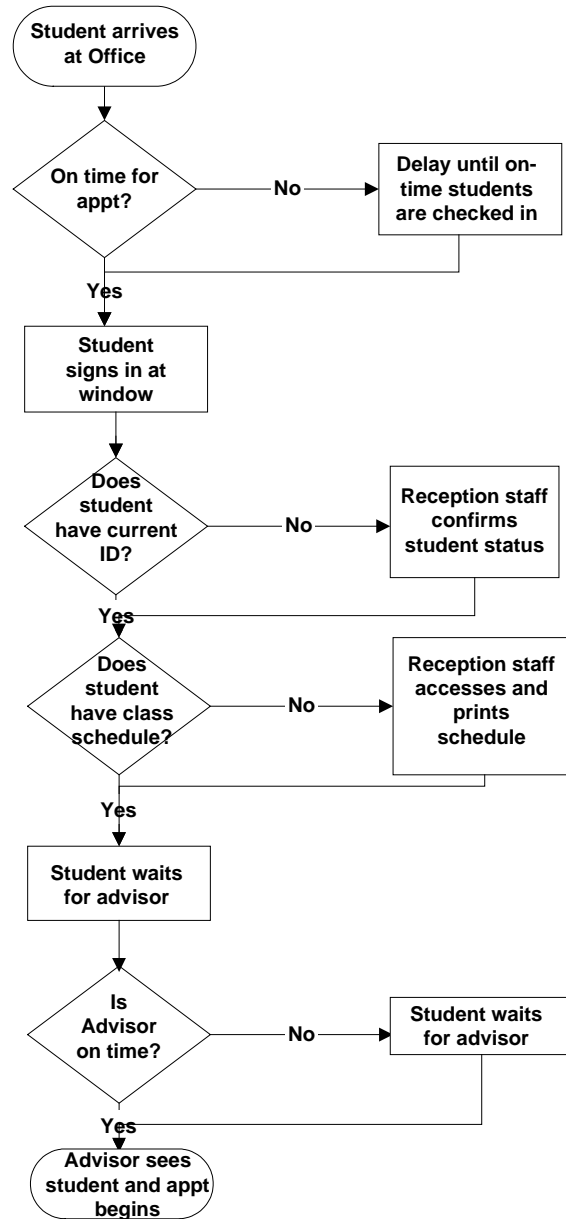
Top-down flowcharts are used to identify the major steps of a process. List the major steps across the top of the page. Then list additional steps below the corresponding major steps.

Top-down flowcharts are sometimes referred to as "high level" flowcharts.



Vertical Flowchart

Fictional Student Registration for Academic Advisors



Histograms

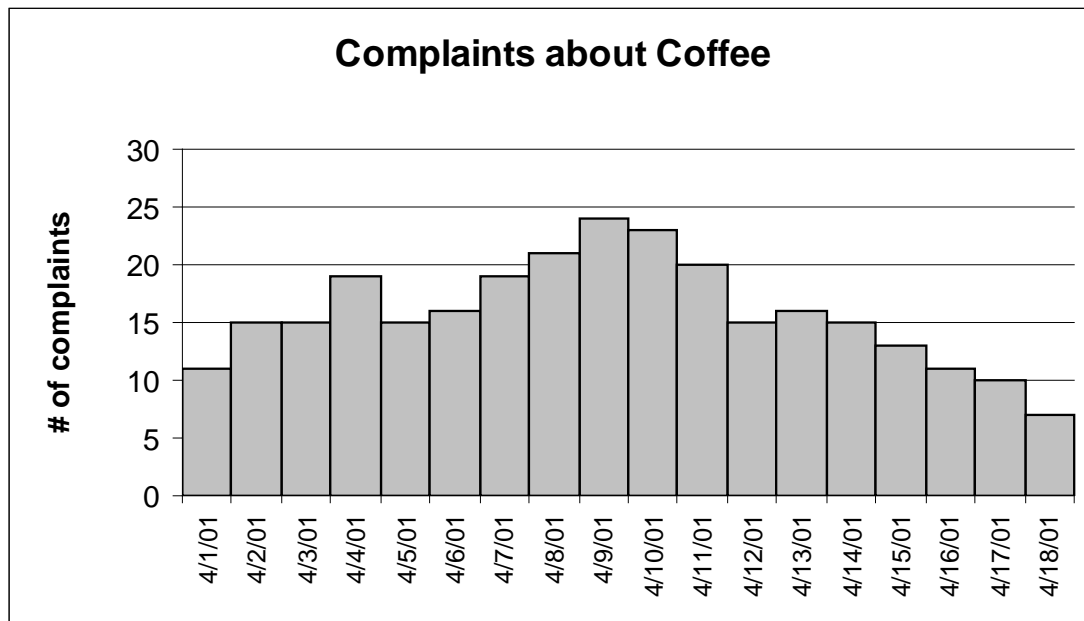
Histograms are bar graphs that show how often different values occur. Histograms take measurement data (e.g., processing time, response time, scores) and display the distribution to reveal the amount of variation that the process has within it.

Primary Application

- To analyze quickly whether a process can meet the customer's requirements
- To determine whether the output of a process is distributed approximately normal
- To communicate the distribution quickly and easily to others

Steps to Constructing

1. Gather & tabulate data (time, weight, size, frequency of specific occurrence)
2. Calculate the range & interval width (how many bars to show on graph)
3. Draw the axes
4. Tabulate the data by intervals
5. Plot the data
6. Analyze the histogram



Histograms – Variability

Histograms are used to determine the 'spread' or pattern of the data. The most common pattern is the bell-shaped curve known as the 'normal curve.' In a normal curve, points are as likely to occur on one side of the average as on the other.

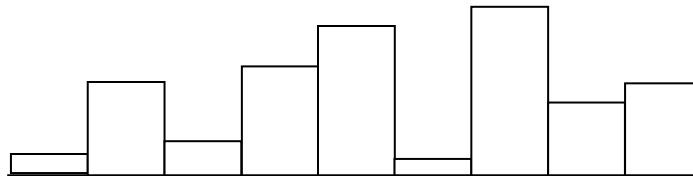
Below are samples of histograms which are not normally distributed.

Small Variability



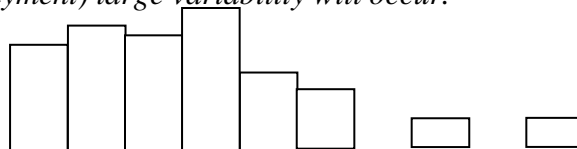
In this set of data, there isn't much difference in numbers – there is little variation. This distribution could occur if a process is very consistent, one in which the same results occur almost all of the time. *If the time to pay an invoice is always within 5 days, there would be little variability in the histogram.*

Large Variability



This kind of pattern is the opposite of the one above. In this distribution, there is considerable difference in the numbers. This distribution could occur if there is a process which is not under control. *For example, if the time to process invoices can vary from 2 days (if the invoice is hand-carried through the process) to 3 months (if the invoice sits in the department for months before being submitted for payment) large variability will occur.*

Skewed Variability



In a skewed distribution, the bars in the graph are lopsided meaning they stack up on one end or the other of the graph. In the skewed graph above, there is a left skew because more of the numbers are on the left side of the graph. *This kind of distribution could result in an invoice process if most invoices are paid relatively quickly (in less than one week), but a few take months to be paid.*

In contrast, a right skewed distribution is one in which more numbers stack on the right side of the graph. *In the invoice example, a right skewed distribution would happen if a few invoices were paid in less than a week but most bills took months to be paid.*

Implementation Plan

Implementation and communication plans can help bring about a successful implementation of a solution.

Primary Application

- To list necessary steps for implementation of your improvement efforts
- To provide a mechanism for tracking progress
- To document who should be notified, and when

Steps to Constructing

1. List steps that need to be completed - refrain from too detailed descriptions
2. Determine who is responsible for each step
3. Decide on a realistic completion date
4. Update as status changes

<i>Action Step</i>	<i>Responsible Person</i>	<i>Complete By</i>	<i>Status / Date</i>

Communication Plan

<i>What Messages need to be conveyed</i>	<i>Target Audience</i>	<i>Medium to Communicate (Email, Newsletter, Meeting, etc.)</i>	<i>Due Date</i>	<i>By Whom</i>

Multi-Voting

Multi-voting is a quick way to narrow down the list of ideas or suggestions. It is an alternative to using colored dots to vote.

Rules for Multi-Voting

- First round - each person has can vote for as many options as they want
 - Eliminate the ideas with the lowest number of votes
- Second round each person can vote for up to half of the ideas
 - Eliminate the ideas with lowest number of votes (should keep at least 5 or 6)
- Third round each person can vote for up to half of the ideas
 - Eliminate the ideas with the lowest votes
- Keep at least 2-3 final ideas for further investigation

Pareto Graph

Pareto graphs are a special form of vertical bar graphs which help to determine which problems to solve and in what order. Doing a Pareto graph based on either a checklist or some other form of data collection helps direct attention to significant problems.

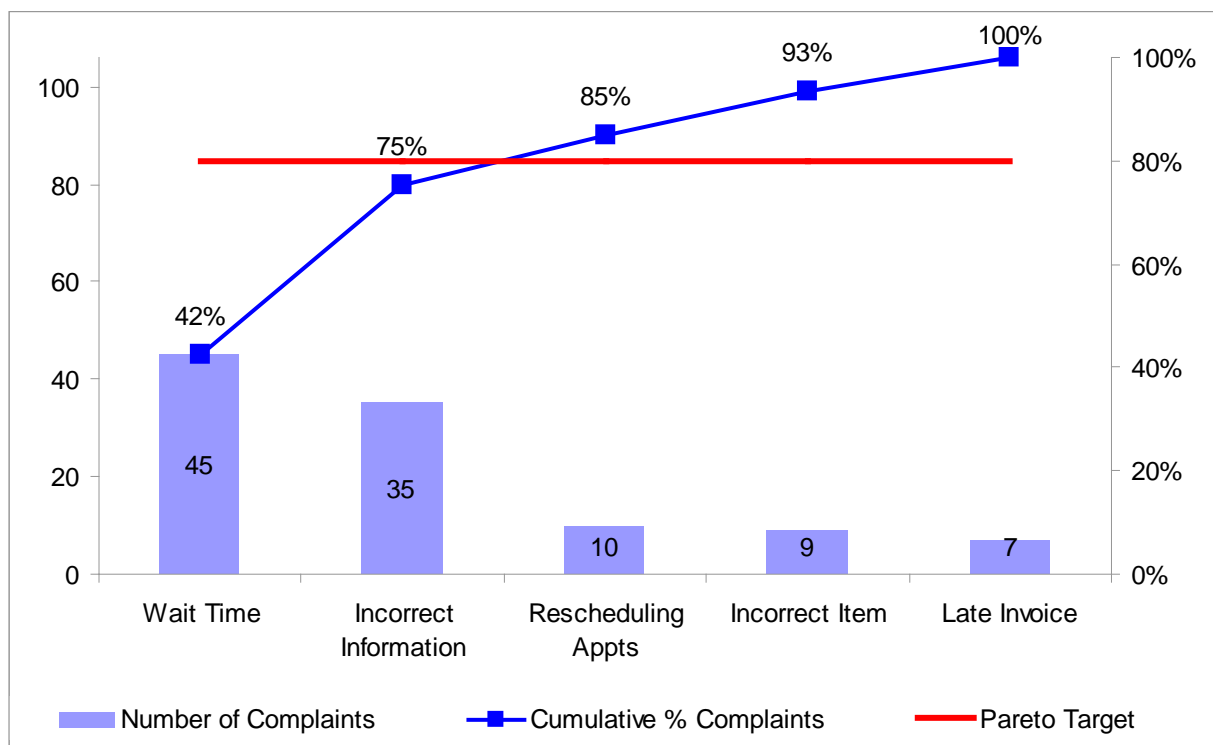
Primary Application

- Assess conformance to customer requirements
- Rank improvement opportunities and set objectives
- Rank order different causes of problems from most to least significant

Steps to Constructing

1. Select problem to be examined or causes to be compared
2. Select standard unit of measurement and time period to be analyzed
3. Collect and summarize data
4. Sort data in order of decreasing frequency
5. Create a bar chart where heights represent frequency
6. Compare frequency of each cause relative to all other causes

Customer Complaints: Visits to Advisor



Plus-Minus-Interesting

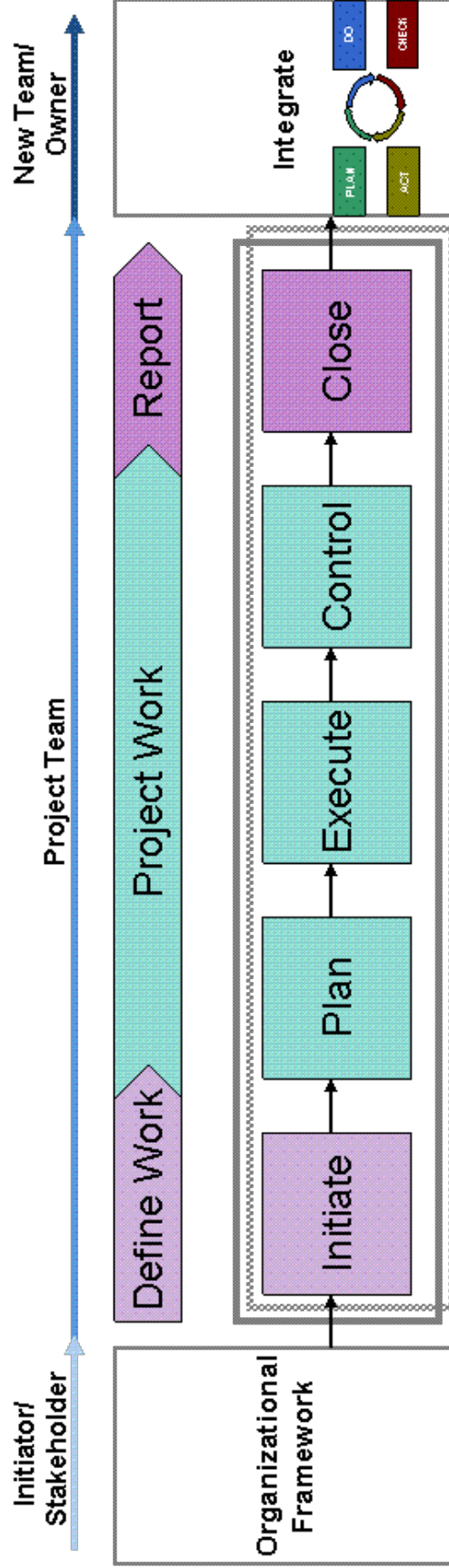
Plus-minus-interesting is an objective way to evaluate solutions and can help identify issues that might otherwise be overlooked.

Steps to Constructing

1. List the solutions in the left column
2. Across the top make 3 columns - Plus, Minus, & Interesting
3. For each solution, list things that are positive, negative, or interesting about it

<i>Possible Solutions</i>	<i>Plus</i>	<i>Minus</i>	<i>Interesting</i>
New coffee maker	New technology	Cost	<ul style="list-style-type: none">• Size• What to do with old coffee maker
Different brand of coffee	Test	Agreement on brand	<ul style="list-style-type: none">• Customer preference• Cost (increase or decrease)
Filtered water	Taste	Cost	
Read / follow coffee maker directions	No cost	<ul style="list-style-type: none">▪ Staff motivation▪ Language difficulties	
Train staff on coffee making procedures	<ul style="list-style-type: none">• Cross trained staff• Coverage during absences	Time to train	Rotation of duties

Financial Management Project Lifecycle



- ❖ **Organizational Framework** – identify project and align with strategy map, identify and provide resources, project scheduling, prioritizing, direction-setting, issue resolution, milestone reviews
- ❖ **Initiate** – develop business case and project plan/charter, including role(s) of sponsor(s), owner(s), define problem/opportunity with supporting data, participants, success measure(s), and scope (boundaries and parameters)
- ❖ **Plan** – develop execution steps, timeline, dependencies, milestone dates, plans for risk and risk mitigation, plans for communications and for training
- ❖ **Execute** – do the work defined in plans
- ❖ **Control** – hold milestone meetings with sponsors, produce reports on performance and success measure(s), identify issues, resolutions, and management (e.g. scope management)
- ❖ **Close** – report results, determine ownership and integration into ongoing work of all affected work units, evaluate the project, summarize lessons learned, and document the process and materials developed
- ❖ **Integrate** – implement agreements, identify ongoing roles/responsibilities, create ongoing operational measures and dashboard reporting cycles, provide training, standardize processes, and continually improve

EIT Adopted – Final – 6/12/07

Project Progress Checklist

Project progress checklists can be used to monitor the team's progress through the PDCA cycle. This tool can help if a team gets stuck between phases of a project. Some of the items may not pertain to your team – or you might be able to identify other steps that are not listed here that you want to add.

Team charter / mission statement

- ☐ Receive from management
- ☐ Clarify, modify if necessary
- ☐ Get management approval for mission revisions
- ☐ Define goals and objectives related to mission

Planning

- ☐ Select team members
- ☐ Determine when team meetings will be held
- ☐ Create an improvement plan
- ☐ Develop a top-down flowchart of project stages

Education / team building activities

- ☐ Introduce team members
- ☐ Explain roles and expectations
- ☐ Provide training in needed data tools
- ☐ Develop ownership in project

Study the process

- ☐ Construct top-down flowchart of process
- ☐ Interview customers to identify needs
- ☐ Design data gathering procedures
- ☐ Gather data on process
- ☐ Analyze data to see if process is stable
- ☐ Identify problems with process

Analyze the process

- ☐ Identify possible causes of problems
- ☐ Select likely causes
- ☐ Gather data to establish root causes
- ☐ Analyze data
- ☐ Rank causes
- ☐ Develop permanent solutions

Make changes & document improvements

- ☐ Develop a pilot plan to test changes
- ☐ Implement pilot
- ☐ Gather data on new process
- ☐ Analyze data, critique changes in light of data
- ☐ Redesign improvements in process and repeat this step if necessary
- ☐ Implement additional changes
- ☐ Monitor results of changes
- ☐ Establish a system to monitor in the

Closure

- ☐ Prepare presentation on project
- ☐ Deliver presentation
- ☐ Evaluate team's progress
- ☐ Document changes in the process

Run Charts

(Trend Charts)

Run charts, which are sometimes referred to as trend charts, are used to visually represent data over time. They can help monitor a process to see whether or not the long-range average is changing. Run charts are simple tools to construct and use.

Primary Application

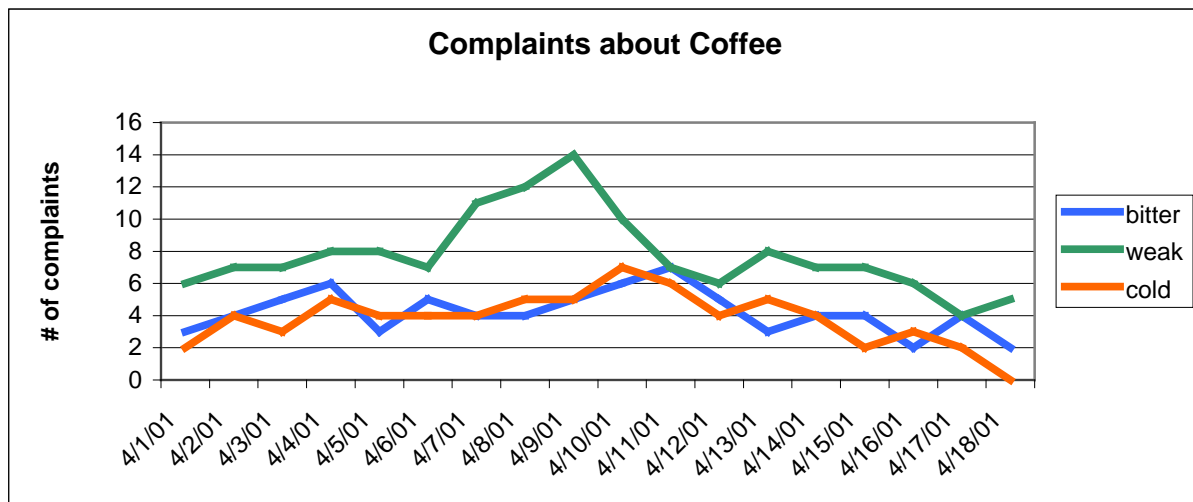
- To monitor quality measures
- To focus attention on meaningful shifts in data
- Find patterns that can yield valuable insights
- Compare one period of data to another, checking for changes

Steps to Constructing

1. Identify what to measure (quality indicator such as volume, cycle time, errors, waste)
2. Collect data
3. Plot data on graph
4. Search for patterns or trends in data

Cautions / Drawbacks

When using run charts to plot data, there is a tendency to see every variation in data as being important. The user should remember that run charts are used to help focus attention on truly vital changes in the process, which may represent a trend or shift in the average.



Surveys

Surveys are used to collect data about the knowledge and opinions of a targeted group of people. Common types of surveys are written questionnaires and face-to-face or telephone interviews. Surveys are commonly used in quality improvement efforts to discover customers' views of how a process is functioning.



Primary Application

- When identifying customer requirements
- When assessing performance against requirements
- When identifying or prioritizing problems to address
- When assessing whether an implemented solution was successful
- Periodically to confirm that improved performance is being maintained

Steps to Constructing

1. Determine objective of survey – what you hope to learn
2. Write down as many questions as possible related to the objective, then narrow to a few critical ones
3. Rewrite questions emphasizing question type and wording
 - Close-ended questions are structured, offering only specifically stated response alternatives such as multiple choice, rating scale, yes/no or agree/disagree
 - Open-ended questions are unstructured and permit free latitude in response but hard to tabulate
4. Arrange questions in logical sequence by topic and from general to specific within topic
5. Write directions and plan page layout
6. Test draft survey by surveying a small sample of people
7. Revise survey as needed
8. Distribute survey

Ways to increase response rate of surveys

- Have surveys printed on colored paper so they don't get lost on desks
- Use email for surveys
- Use personal addressing as opposed to a form letter
- Plan for second mailing to increase response rate
- Obtain organizational commitment to permit & encourage people to participate