Live Session 1

1. **Welcome and agenda review**
2. **Introductions**
3. **Ground rules, interactions** (live sessions, wall, messages, office hours)
4. **Overview of course**
   a. DMAIC
   b. Syllabus review (including Launchpad, 2SU, project discussion)
5. **Topic Review**
   a. Continuous/Discrete
   b. Process Map/Thought Process Map
   b. Kappa
6. **Project discussion**
   a. how to choose a project
   b. review Project Definition Worksheet
7. **Assignments for next 2 weeks**
8. **Wrap up, feedback**

Interactions/Expectations

1. **Coursework**
   Complete asynchronous content before our live sessions

2. **BLT's (Bi-directional Learning Tools)**
   We will use these for breakouts/discussions in class.
   Many of them are very helpful in building your paper each week.

3. **Office Hours**
   Weekly

4. **Messages/Emails**
   I will reply within 24 hours

5. **Course Wall**
   Please use the course wall for all general questions
   Check the wall regularly for announcements and info

Course Overview

SYLLABUS REVIEW, DMAIC

Syllabus Review

ASSIGNMENTS	No. of	Total Points
Class Participation	10	10
Quizzes	2	20
Homework Assignments	6	20
Business Process Improvement Project:		
• Problem Definition Worksheet	1	10
• Process Improvement Project	1	20
Final Exam	1	20
Total Points		100

1.Syllabus (with due dates) has been loaded to course wall

2. Assignments and Deliverables folder includes information on assignments

note: Launchpad assignments must be completed on Launchpad site

3. Participation Points

There are 10 opportunities for participation points, 1 for each live class attended fully.

DMAIC

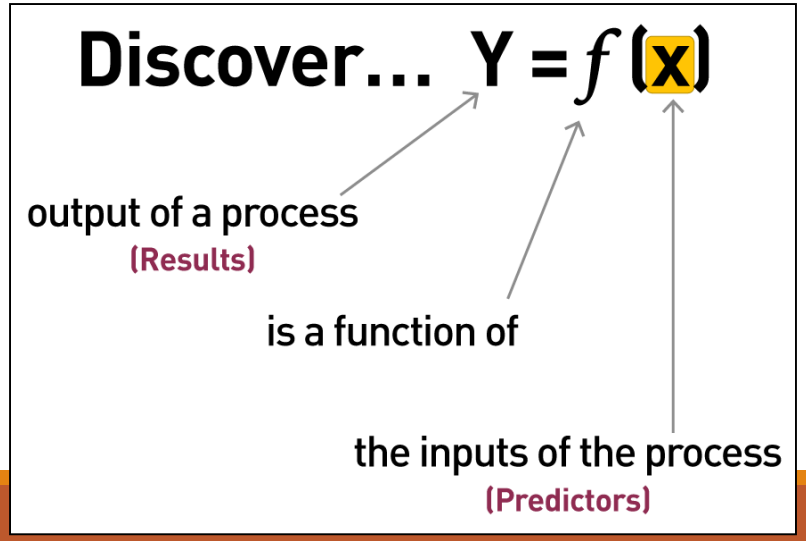
Define: Identify the problem and the team's scope.

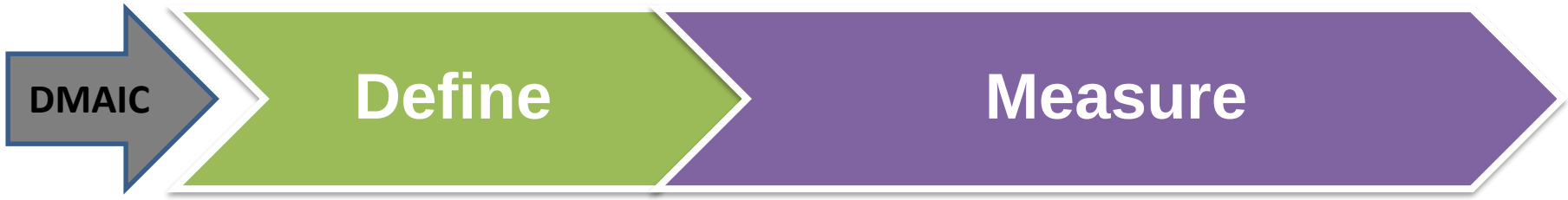
Measure: Develop data collection plan and implement it.

Analyze: Determine root causes; identify and verify critical variables.

Improve: Develop/select/pilot and then implement a solution.

Control: Put a control plan in place; ensure the problem stays fixed.





Description:

Clearly identify the business problem / performance gap (output measure), customer, scope, goals and resources.

Key Concepts:

y = f(x)
Types of data
Descriptive statistics and soft tools

Project:

Complete Problem Definition Worksheet

Tools:

Process map
SIPOC
Descriptive statistics
Thought process map
Affinity diagram
Sigma Quality Level (SQL)

Description:

Validate your measurement system and collect baseline data.

Key Concepts:

Mapping a process/value-stream, forms of waste, measurement error, reproducibility, repeatability

Project:

Identify potential inputs, develop operational definitions, develop data measurement/collection plan, validate measurement system, collect baseline data, calculate SQL.

Tools:

Operational definitions
Kappa
Process map (detailed)
Data measurement plan
Data stratification tree
Histogram
Trend/ line chart
Pareto chart
Fishbone (cause/effect) diagram

Analyze

Description:

Analyze, describe, and present the data to discover the root cause(s), identify/prioritize critical inputs (x's), determine the inputs impact on the output.

Key Concepts:

Inferential statistics, common distributions, developing a hypothesis, determining the likelihood some event happens based on a sample (calculating probabilities), Using the normal distribution as the "go to" distribution.

Project:

Write a null and alternative hypothesis statement.

Tools:

Hypothesis testing
Chi-square test for independence

Week 3 & 4

Key Concepts:

Collecting sample data, how confidence intervals and sample size are related.

Project:

Utilize the sample size formula.

Tools:

Confidence intervals.

Week 5

Key Concepts:

Determining input's (x) impact on the output (y).

Project:

Use regression to identify relationships between the output (y) and inputs (x's).

Tools:

Correlation
Simple linear regression
Multiple regression
Scatterplot
Trend/ line chart
Pareto chart
Fishbone (cause/effect) diagram

Week 6 &7

Improve

Description:
Develop potential solutions, select best solution, pilot solutions, measure results, document new process.

Key Concepts:
Discover y= f(x)

Project:
Implement a solution, run a pilot, evaluate the results, complete a hypothesis test.

Tools:
Affinity diagram
Fishbone cause/effect diagram
Pareto
Control charts
Hypothesis testing
Process map
Solution selection matrix

Control

Description:
Implement process changes and controls. Verify expected performance was achieved, monitor performance to sustain new levels.

Key Concepts:
Xbar/R and ImR control charts, Different control charts applicable to different processes, time series forecasting methods predict future performance.

Project:
Utilize an appropriate control chart and /or time series forecasting method

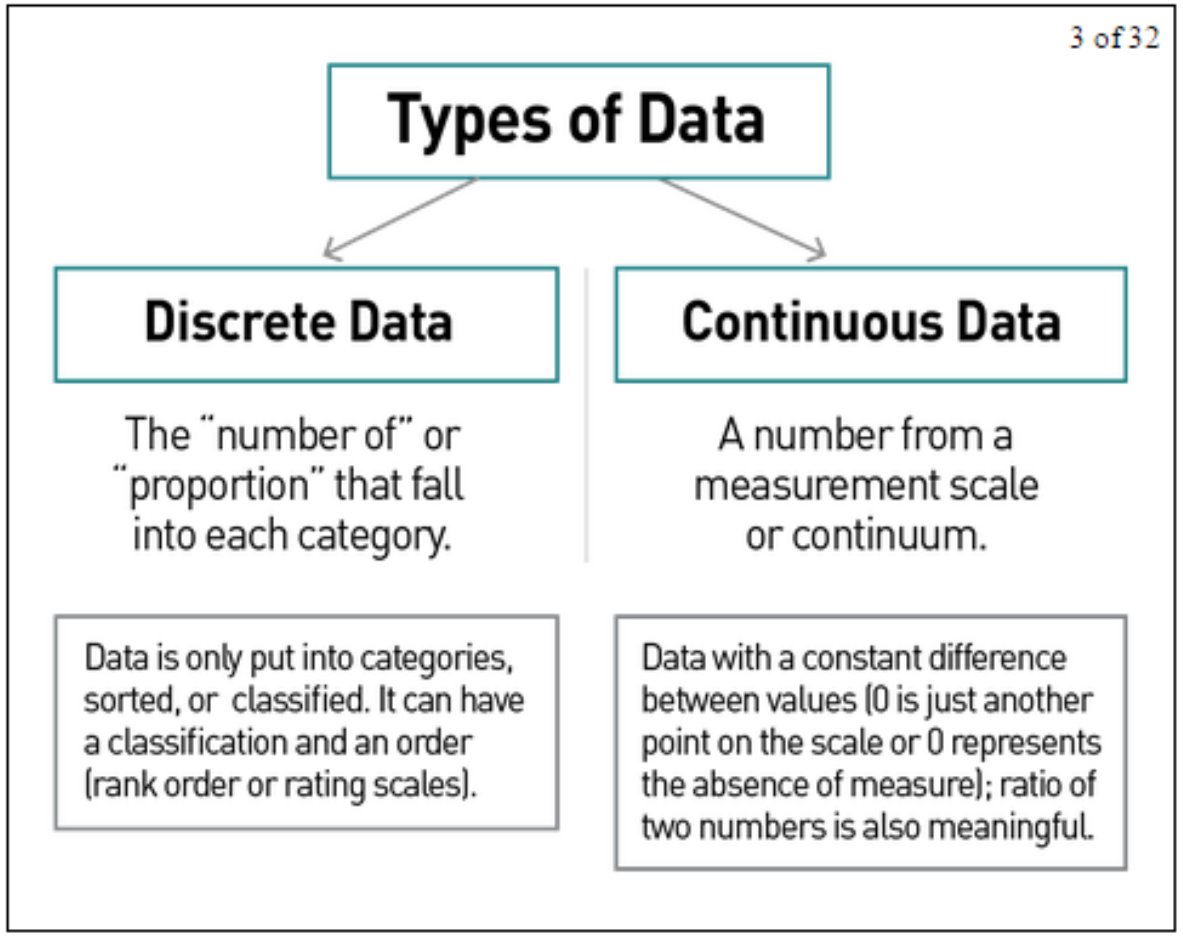
Tools:
Control charts
Time series analysis
Operational definitions
Process map
Sigma Quality Level (SQL)

Week 8 → **Week 9**

Topic Review

CONTINUOUS/DISCRETE, PROCESS MAP/THOUGHT PROCESS MAP, KAPPA

Discrete/Continuous Data

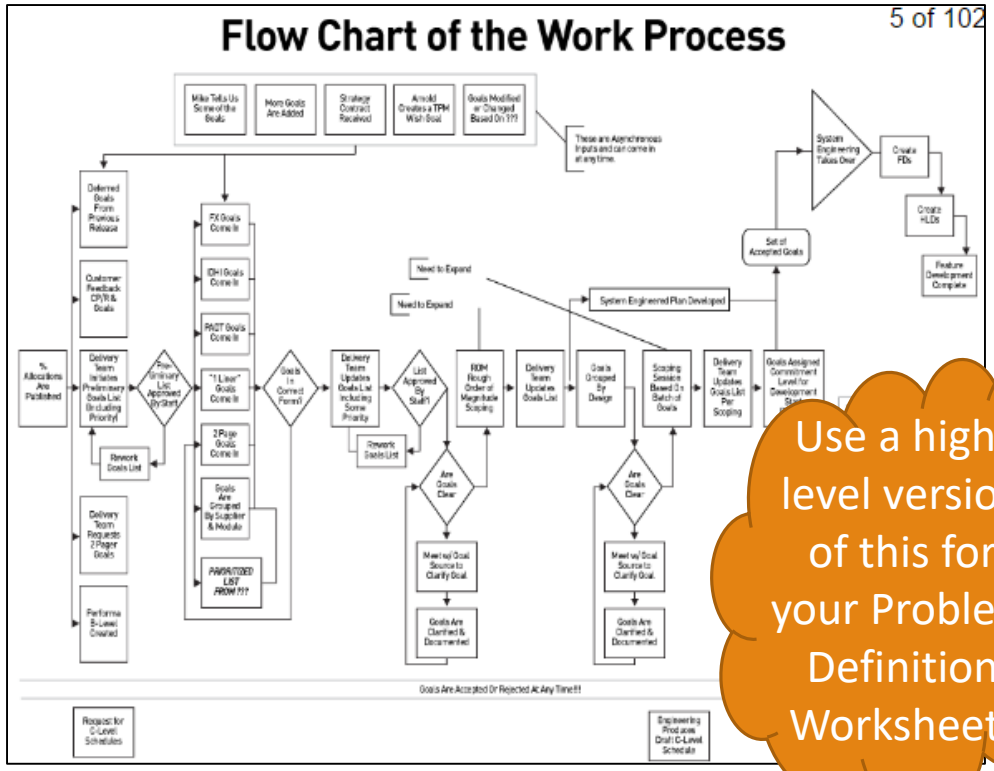


What are the benefits of using one versus the other?

Process Map

Coursework Section 1.8 & Week 2 (Hank the Handyman)

Flowchart of the process, includes decision points

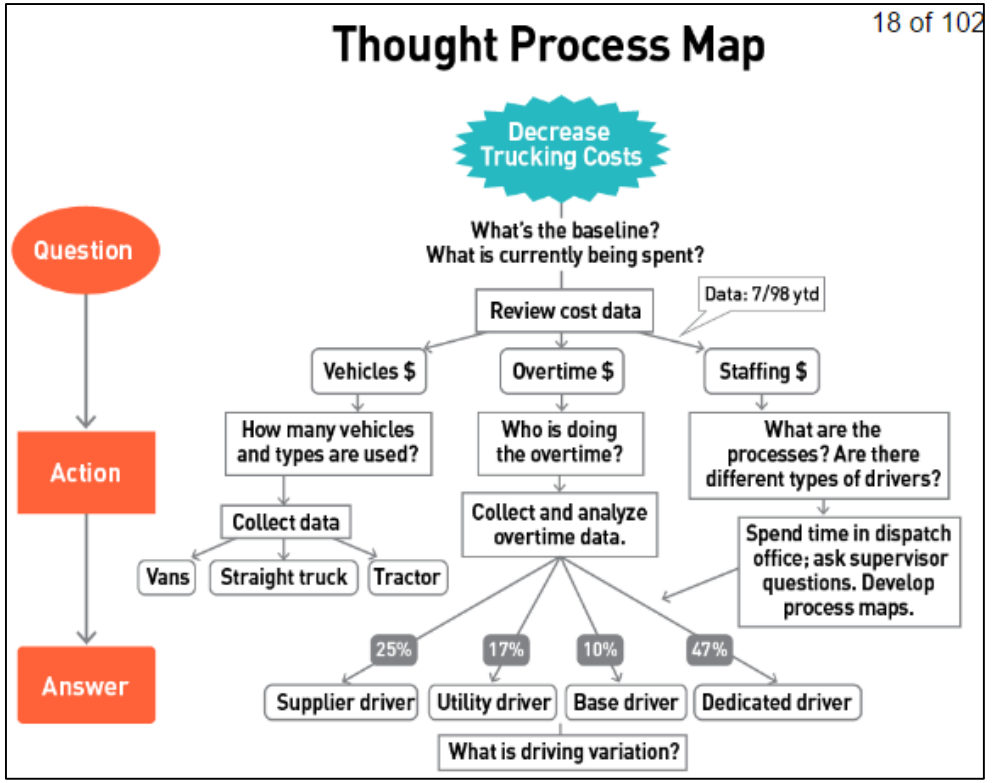


Use a high-level version of this for your Problem Definition Worksheet!

Thought Process Map

Coursework Section 1.8 (starting at slide 9)

Question → Answer→ Action



Kappa
Coursework Section 1.9

Between Operators: Reproducibility

	1	2	3	4	5	6	7	8	9	10	11	12	Good	Bad	Total Agree
Me	G	G	G	B	B	B	G	B	B	B	G	B	5/12	7/12	
You	G	G	G	G	G	B	B	B	G	B	G	G	8/12	4/12	
	✔	✔	✔			✔		✔		✔	✔				7/12 = 0.58

- $P_{observed}$=0.58
- P_{chance}=(0.42)(0.67)+(0.58)(0.33)=0.47
- K=$(_{0.58-0.47)/(1-0.47)}$=0.21
- Indicates that our measurement system is not good, K should be > 0.7

Within Operator: Repeatability

	1	2	3	4	5	6	7	8	9	10	11	12	Good	Bad	Total Agree
Day 1	G	G	G	B	B	B	B	B	B	B	G	G	5/12	7/12	
Day 2	G	B	G	B	B	G	B	B	B	B	G	B	4/12	8/12	
	✔		✔	✔	✔		✔	✔	✔	✔	✔				9/12 = 0.75

- $P_{observed}$=0.75
- P_{chance}=(0.42)(0.33)+(0.58)(0.67)
- K=$(_{0.75-0.52)/(1-0.52)}$=0.48
- Still too low: K should be ≥ 0.85

How is this useful? What did you notice in your Peanut Exercise?

Project Discussion

PROJECT SELECTION, PROBLEM DEFINITION WORKSHEET

Business Process Improvement Project

Project Selection Criteria:

- Select an issue or opportunity that can be written as a problem statement.
- Must be within your sphere of influence.
- Is not an attempt to solve world hunger.
- Uses data that is accessible to you or can be collected in a reasonable amount of effort/time.
- You have the ability to measure the current and future state. You have access to baseline data or can collect it.
- Preferably uses more continuous data (rather than all discrete data).
- Fixing this problem will provide value. You should develop a business case to support working this issue (consider your time and others when calculating ROI.)

Examples:

Improve product quality
Reduce expenses
Improve the output of your organization
Decrease wait time

Reference documents are loaded in the Files section of our course

Problem Definition Worksheet - Complete each section below:

A) <u>Problem Statement:</u> Define your problem. What pains are you (or your customers, family, clients, etc.) experiencing? What is broken, wrong or not working? How do you know that you have a problem? What is telling you this? What is your **evidence**?

B) <u>Business Impact:</u> Why should you fix this problem? What is the estimated benefit for solving this problem? What is this problem worth in **dollars**? How will you measure success? What is your key output (y)?

C) <u>Goals:</u> What are your improvement objectives, **goals** or targets? How much "better" do you want to be? **Quantify** this goal.

D) <u>Project Scope:</u> What are your boundaries? What is the first step and last step of the process you need to **fix**? What is ***not*** within your scope?

E) <u>Team:</u> Who is the process owner/champion? Who do you need to work with or involve to analyze and/or impact this process?

F) <u>Project plan:</u>(very high-level): Estimate **time (or date)** per DMAIC step. Develop a rough timeline.

G) <u>Process Map</u>: What are the steps in the process you are trying to fix? Document the flow of process steps (of the process you are working to improve). This should be a high-level flow chart.

Next two weeks

1.Project Next Steps - Define Phase

Problem Definition Worksheet

2. Coursework BLT's:

Video Intro

1.5 Exercise: What Type of Data?

1.7 Operational Definitions

1.10 Peanut Exercise

2.5 Hank the Handyman: Mapping the Process

2.6 Hank the Handyman: Describing the Data

2.7 Hank the Handyman: Improving the Process

3. Assignments:

Problem Definition Worksheet	Due 3 days after Live Session 1, midnight eastern
Quiz #1	Due next week: 3 days after Live Session 2, midnight eastern