WEEK 13

TOOLS AND TECHNIQUES

AN OVERVIEW

Selecting tools and techniques

- When selecting tools there are two factors which organization should keep in mind:

1. The application of any tool or technique in isolation without a strategy and plan will only provide short term benefits.
2. No one tool or technique is more important than another.

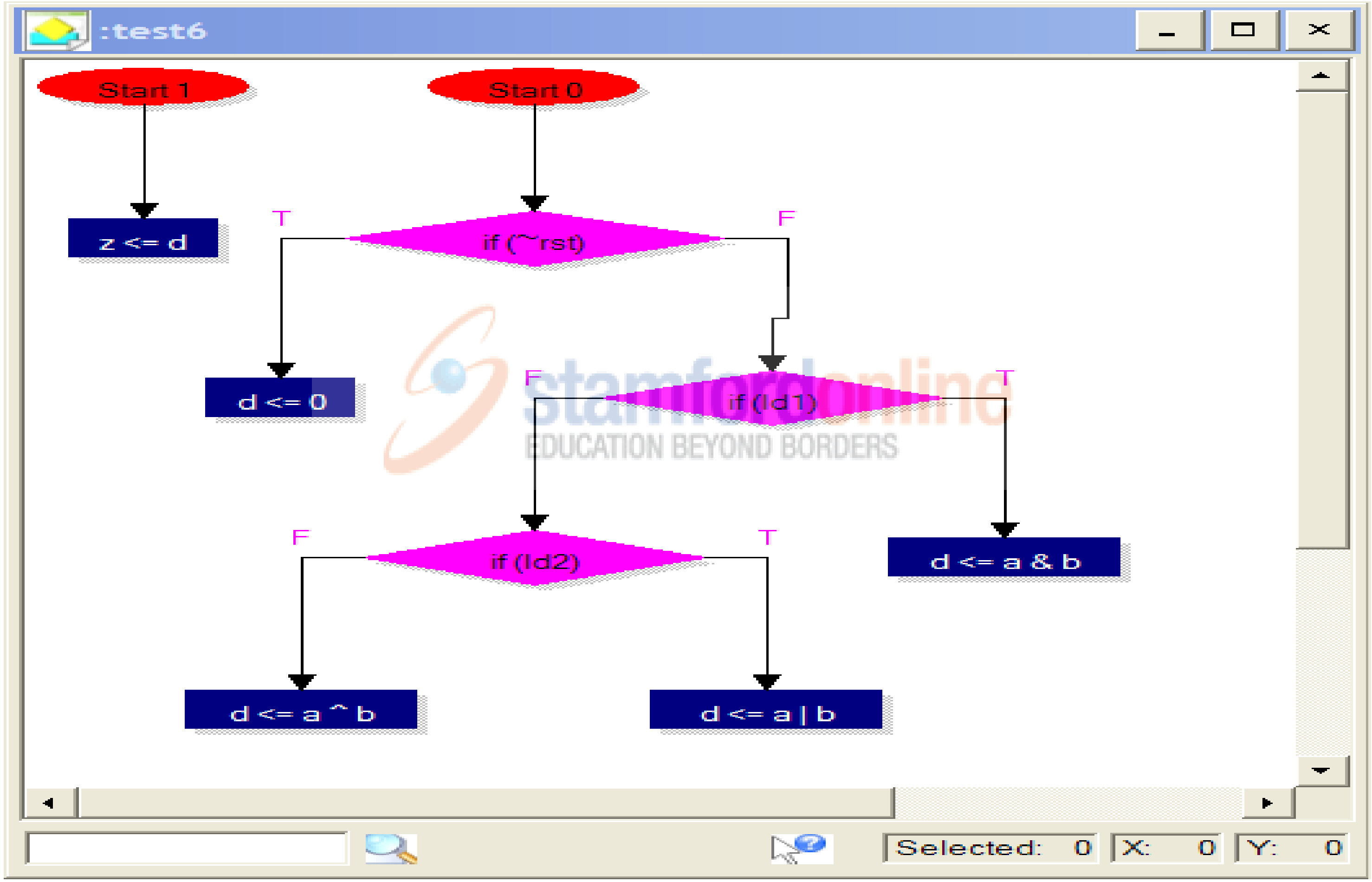
Flowchart

- Process mapping sometimes also called “blueprint” or process modelling.
- To provide a diagrammatic picture, often by means of a set of established symbols.
- Activity is included.

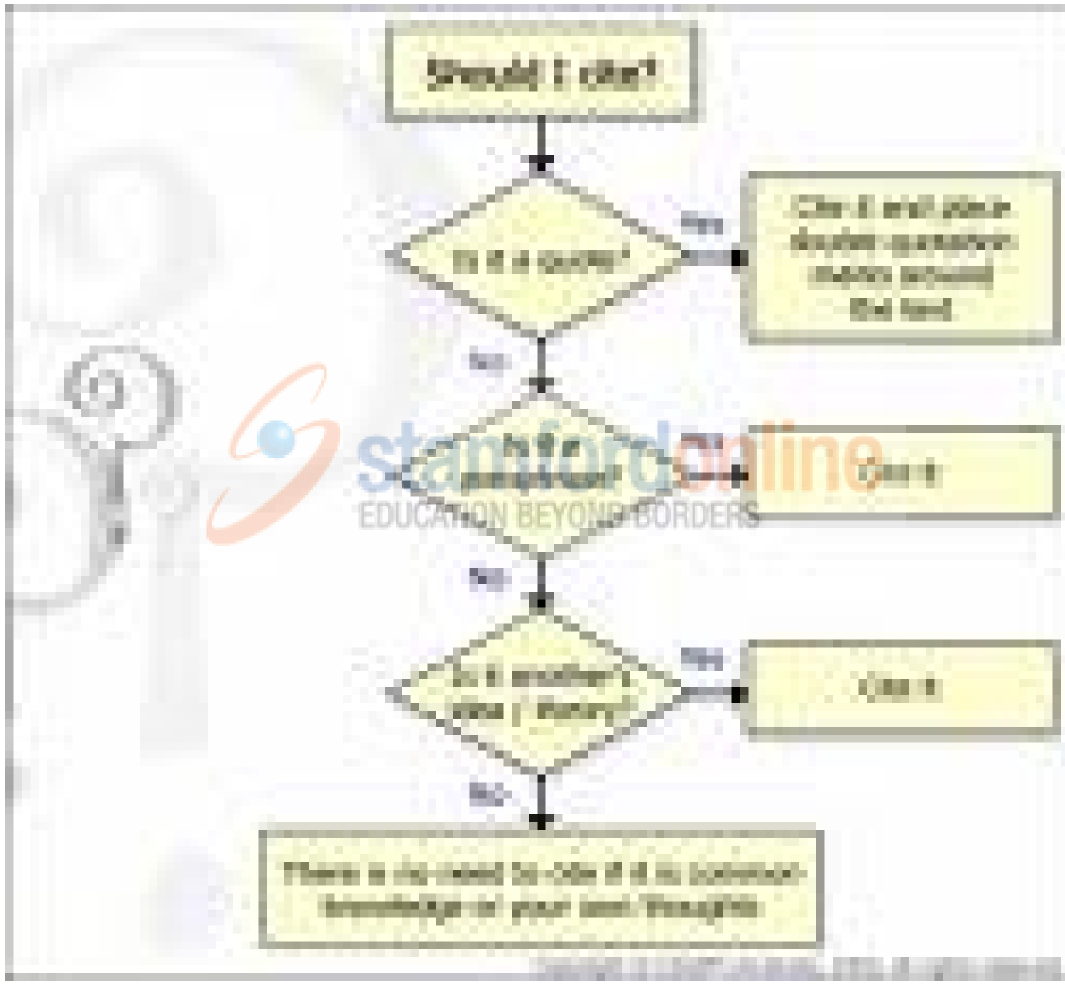
Steps in constructing a flow chart:

1. Define the process and its boundaries, including start and end boundaries.
2. Decide the type and method of charting and the symbols to be used, and do not deviate from the convention chosen.
3. Decide the detail with which the process is to be mapped.
4. Describe the stages and sequence.
5. Assess if these stages are in correct sequence.
6. Ask people involved with the process to check its veracity.

Examples of flowchart:



Continue: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Checklist

- Used to record data
- Must be simple and convenient
- Also called: defect concentration diagram

Description

- A check sheet is a structured, prepared form for collecting and analyzing data. This is a generic tool that can be adapted for a wide variety of purposes.

Check Sheet Procedure

- Decide what event or problem will be observed. Develop operational definitions.
- Decide when data will be collected and for how long.
- Design the form. Set it up so that data can be recorded simply by making check marks or Xs or similar symbols and so that data do not have to be recopied for analysis.

- Label all spaces on the form.
- Test the check sheet for a short trial period to be sure it collects the appropriate data and is easy to use.
- Each time the targeted event or problem occurs, record data on the check sheet.

When to Use a Check Sheet

- When data can be observed and collected repeatedly by the same person or at the same location;
- When collecting data on the frequency or patterns of events, problems, defects, defect location, defect causes, etc.;
- When collecting data from a production process.
- Example of check sheet:

Telephone Interruptions

Reason	Day					
	Mon	Tues	Wed	Thurs	Fri	Total
Wrong number	𝍸	||	|	𝍸	𝍸 ||	20
Info request	||	||	||	||	||	10
Boss	𝍸	||	𝍸 ||	|	||||	19
Total	12	6	10	8	13	49

Histogram

Purpose Of A Histogram

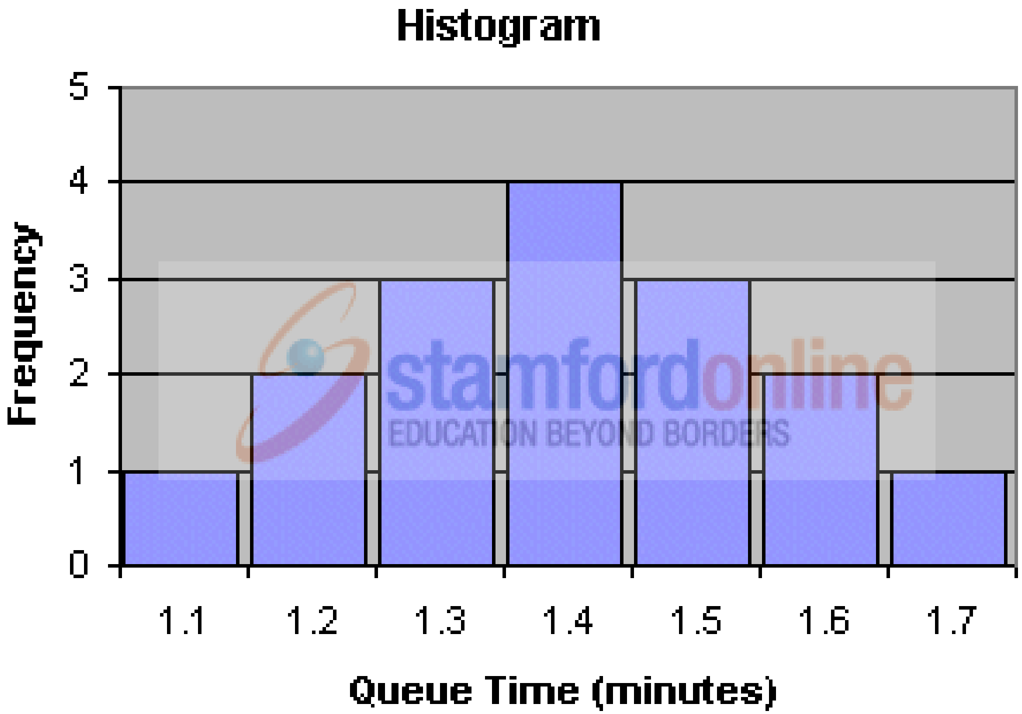
- A histogram is used to graphically summarize and display the distribution of a process data set.

How To Construct A Histogram

- A histogram can be constructed by segmenting the range of the data into equal sized bins (also called segments, groups or classes). For example, if your data ranges from 1.1 to 1.8, you could have equal bins of 0.1 consisting of 1 to 1.1, 1.2 to 1.3, 1.3 to 1.4, and so on.

- The vertical axis of the histogram is labelled Frequency (the number of counts for each bin), and the horizontal axis of the histogram is labelled with the range of your response variable.
- You then determine the number of data points that reside within each bin and construct the histogram. The bin size can be defined by the user.

Histogram example:



Pareto chart

Purpose Of A Pareto Chart

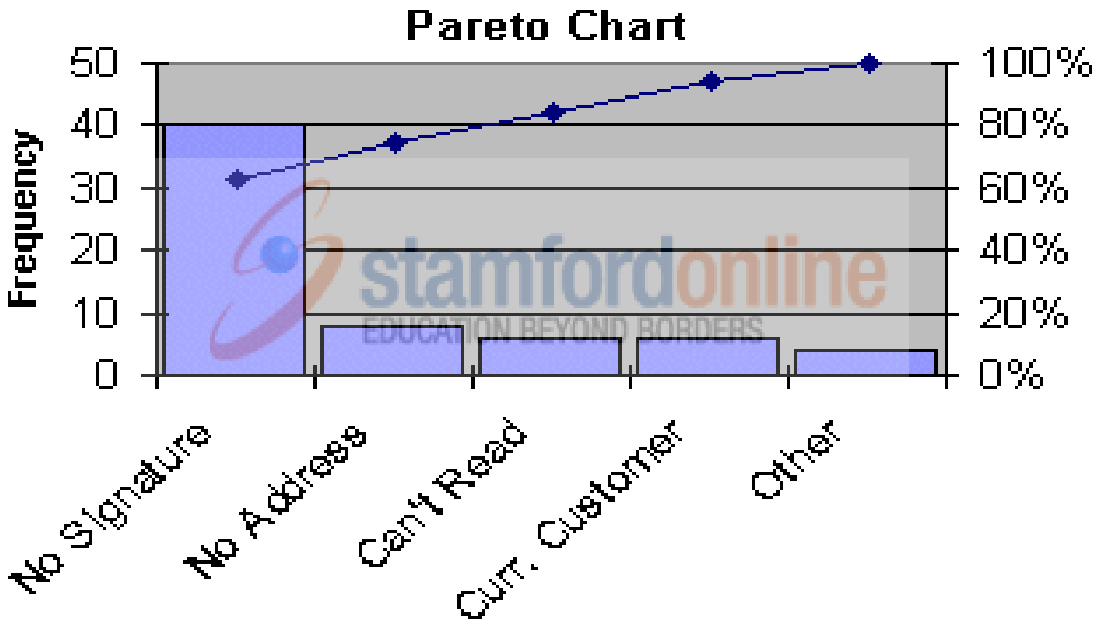
- A pareto chart is used to graphically summarize and display the relative importance of the differences between groups of data.

How To Construct A Pareto Chart

- A pareto chart can be constructed by segmenting the range of the data into groups (also called segments, bins or categories). For example, if your business was investigating the delay associated with processing credit card applications, you could group the data into the following categories:
- No signature
- Residential address not valid
- Non-legible handwriting
- Already a customer
- Other

- The left-side vertical axis of the pareto chart is labelled Frequency (the number of counts for each category), the right-side vertical axis of the pareto chart is the cumulative percentage, and the horizontal axis of the pareto chart is labelled with the group names of your response variables.
- You then determine the number of data points that reside within each group and construct the pareto chart, but unlike the bar chart, the pareto chart is ordered in descending frequency magnitude. The groups are defined by the user.

Example of Pareto:



Fishbone diagram: cause & effect diagram

What is a Fishbone diagram?

- Dr. Kaoru Ishikawa, a Japanese quality control statistician, invented the fishbone diagram. Therefore, it may be referred to as the Ishikawa diagram. The fishbone diagram is an analysis tool that provides a systematic way of looking at effects and the causes that create or contribute to those effects. Because of the function of the fishbone diagram, it may be referred to as a cause-and-effect diagram. The design of the diagram looks much like the skeleton of a fish.

- Therefore, it is often referred to as the fishbone diagram. Whatever name you choose, remember that the value of the fishbone diagram is to assist teams in categorizing the many potential causes of problems or issues in an orderly way and in identifying root causes.

When should a fishbone diagram be used?

- *Does the team...*
- Need to study a problem/issue to determine the root cause?
- Want to study all the possible reasons why a process is beginning to have difficulties, problems, or breakdowns?
- Need to identify areas for data collection?
- Want to study why a process is not performing properly or producing the desired results?

How is a fishbone diagram constructed?

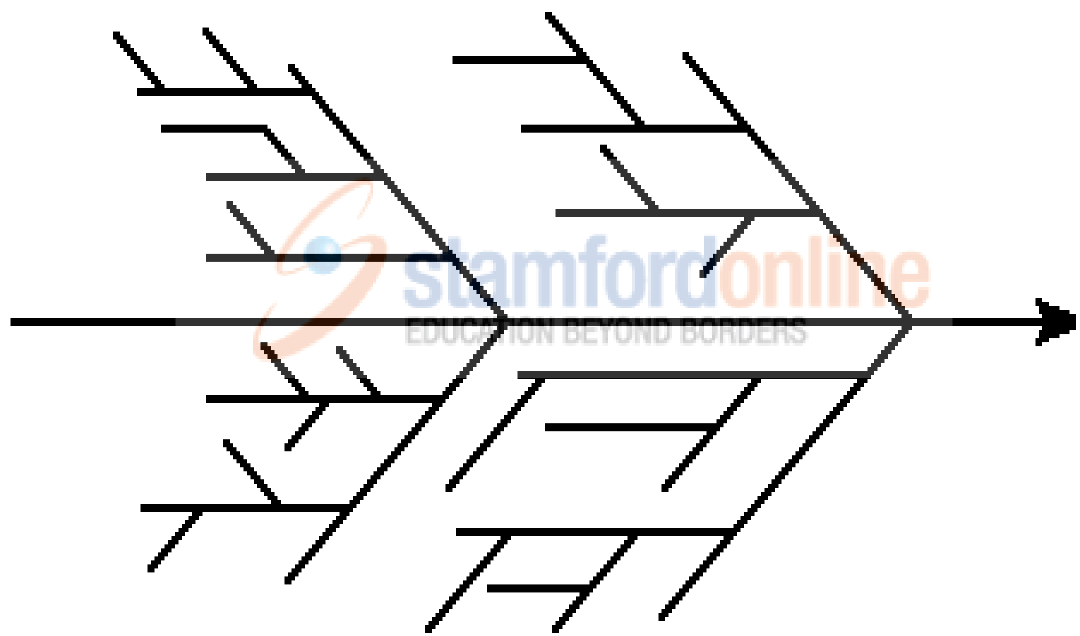
Basic Steps:

- Draw the fishbone diagram....
- List the problem/issue to be studied in the "head of the fish".
- Label each ""bone" of the "fish". The major categories typically utilized are:
- The 4 M’s:
  - Methods, Machines, Materials, Manpower
- The 4 P’s:
  - Place, Procedure, People, Policies
- The 4 S’s:
  - Surroundings, Suppliers, Systems, Skills

- Use an idea-generating technique (e.g., brainstorming) to identify the factors within each category that may be affecting.
- Repeat this procedure with each factor under the category to produce sub-factors. Continue asking, “Why is this happening?”
- Continue until you no longer get useful information as you ask, "Why is that happening?"

- Analyze the results of the fishbone after team members agree that an adequate amount of detail has been provided under each major category.
- For those items identified as the “most likely causes”, the team should reach consensus on listing those items in priority order with the first item being the most probable" cause.

Example of fishbone:



To successfully build a cause and effect diagram:

- Be sure everyone agrees on the effect or problem statement before beginning.
- Be succinct.
- For each node, think what could be its causes. Add them to the tree.
- Pursue each line of causality back to its root cause.
- Consider grafting relatively empty branches onto others.
- Consider splitting up overcrowded branches.
- Consider which root causes are most likely to merit further investigation

Brainstorming

- **Creative thinking** requires tools such as the brainstorm and the affinity diagram. Brainstorming is simply listing all ideas put forth by a group in response to a given problem or question. In 1939, a team led by advertising executive Alex Osborn coined the term "brainstorm."
- According to Osborn, “Brainstorm means using the ***brain*** to ***storm*** a creative problem and to do so "in commando fashion, each stormed audaciously attacking the same objective.”

- Structured brainstorming produces numerous creative ideas about any given "central question". Done right, it taps the human brain's capacity for lateral thinking and free association.

To conduct a successful brainstorm:

- Make sure everyone understands and is satisfied with the central question before you open up for ideas.
- You may want to give everyone a few seconds to jot down a few ideas before getting started.
- Begin by going around the table or room, giving everyone a chance to voice their ideas or pass. After a few rounds, open the floor.
- More ideas are better. Encourage radical ideas and piggybacking.

- Suspend judgment of all ideas.
- Record exactly what is said. Clarify only after everyone is out of ideas.
- Don't stop until ideas become sparse. Allow for late-coming ideas.
- Eliminate duplicates and ideas that aren't relevant to the topic.

Summary

- There is an elusive balance between chasing after each new management tool or method, and ignoring the fact that we have actually learned some things about management over the past 100,000 years. The best tools are those which stand the test of time, and which give you a lot of leverage over common problems.