

**CHAPTER 8**

# **NEW QC TOOLS (MANAGEMENT TOOLS)**

**Expected Outcomes**

Identify application of tools that been used in process improvement, cost reduction, policy deployment and new-product development

Learn how to construct quality tools that don't use hard data but rely on subjective information

# Chapter Outline

- Why-Why Diagram
- Forced Field Analysis
- Nominal Group Technique
- Affinity Diagram
- Interrelationship Diagram
- Tree Diagram
- Matrix Diagram
- Prioritization Matrices
- Process Decision Program Chart
- Activity Network Diagram

# Why Why

- A key to finding the root cause of a problem by focusing on the process rather than on people
- The procedure is to describe the problem in specific terms and then ask why
- Have to ask why three to five times to obtain the root cause
- The tool is very beneficial in developing critical thinking – quick method of solving a problem



# Why Why

Example:

**Problem Statement:** You are on your way home from work and your car stops in the middle of the road.

**1. Why** did your car stop?

– Because it ran out of gas.

**2. Why** did it run out of gas?

– Because I didn't buy any gas on my way to work.

**3. Why** didn't you buy any gas this morning?

– Because I didn't have any money.

**4. Why** didn't you have any money?

– Because I lost it all last night in a poker game.

**5. Why** did you lose your money in last night's poker game?

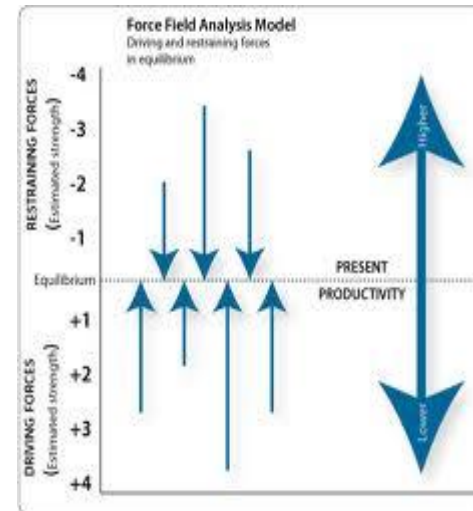
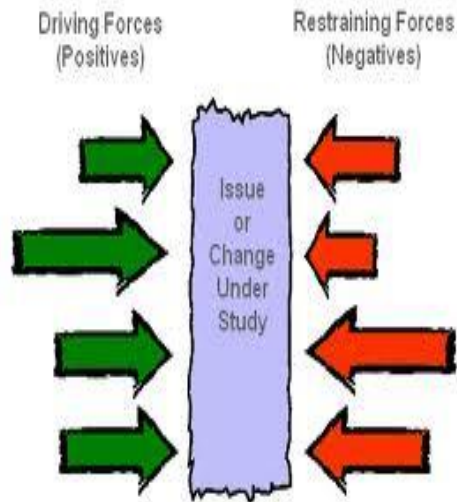
– Because I'm not very good at "bluffing" when I don't have a good hand.

*\*Source: isixsigma*

# Forced Field Analysis

- Analysis is used to identify the forces and factors that may influence the problem or goal
- It helps an organization to better understand promoting or driving and restraining or inhibiting forces
- The positives can be reinforced and the negatives reduced or eliminated
- The procedure is to define the objective, determine criteria for evaluating the effectiveness of the improvement action, brainstorm the forces that promote and inhibit achieving the goal, prioritize the forces from greatest to least and take action.

# Forced Field Analysis



# Nominal Group Technique

Nominal group technique (NGT) is a structured method for group brainstorming that encourages contributions from everyone.

## When to Use Nominal Group Technique

- When some group members are much more vocal than others.
- When some group members think better in silence.
- When there is concern about some members not participating.
- When the group does not easily generate quantities of ideas.
- When all or some group members are new to the team.
- When the issue is controversial or there is heated conflict.

*\*Source: ASQ*

# Nominal Group Technique

- Materials needed: paper and pen or pencil for each individual, flipchart, marking pens, tape.
- State the subject of the brainstorming. Clarify the statement as needed until everyone understands it.
- Each team member silently thinks of and writes down as many ideas as possible in a set period of time (5 to 10 minutes).
- Each member in turn states aloud one idea. Facilitator records it on the flipchart.
  - No discussion is allowed, not even questions for clarification.
  - Ideas given do not need to be from the team member's written list. Indeed, as time goes on, many ideas will not be.
  - A member may "pass" his or her turn, and may then add an idea on a subsequent turn.



# Nominal Group Technique

Continue around the group until all members pass or for an agreed-upon length of time.

- Discuss each idea in turn. Wording may be changed only when the idea's originator agrees. Ideas may be stricken from the list only by unanimous agreement. Discussion may clarify meaning, explain logic or analysis, raise and answer questions, or state agreement or disagreement.
- Prioritize the ideas using multivoting or list reduction.

*\*Source: ASQ*

# Affinity Diagram

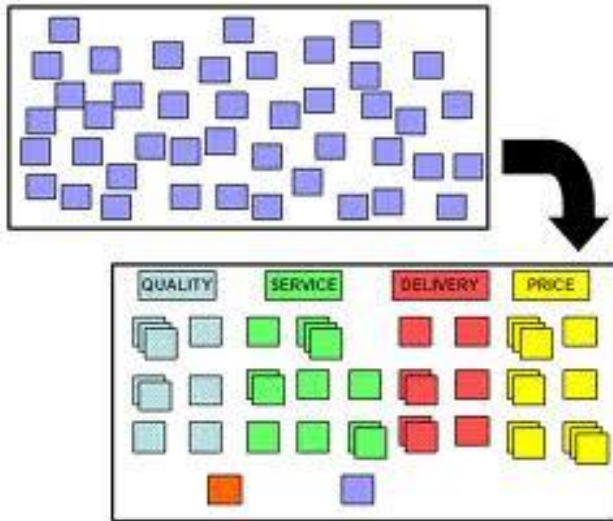
The affinity diagram organizes a large number of ideas into their natural relationships. This method taps a team's creativity and intuition. It was created in the 1960s by Japanese anthropologist Jiro Kawakita.

## When to Use an Affinity Diagram

- When you are confronted with many facts or ideas in apparent chaos
- When issues seem too large and complex to grasp
- When group consensus is necessary
- Typical situations are:
  - After a brainstorming exercise
  - When analyzing verbal data, such as survey results.

*\*Source: ASQ*

# Affinity Diagram



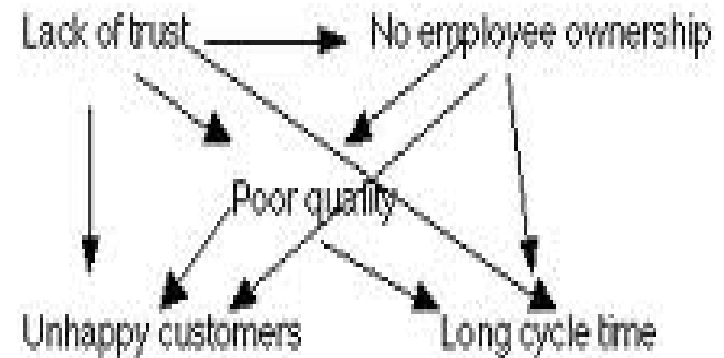
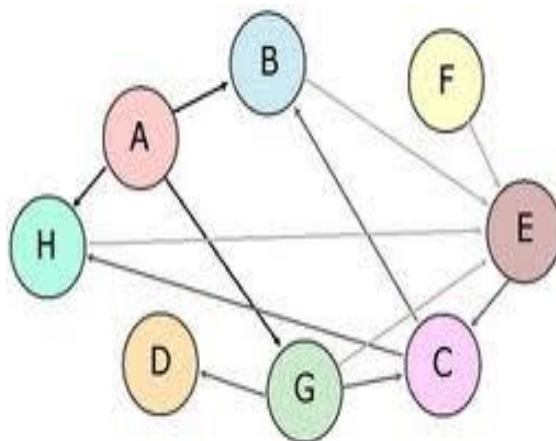
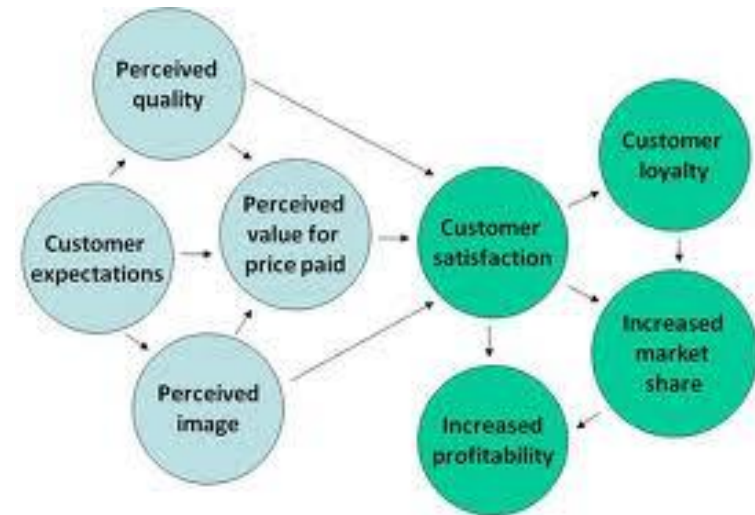
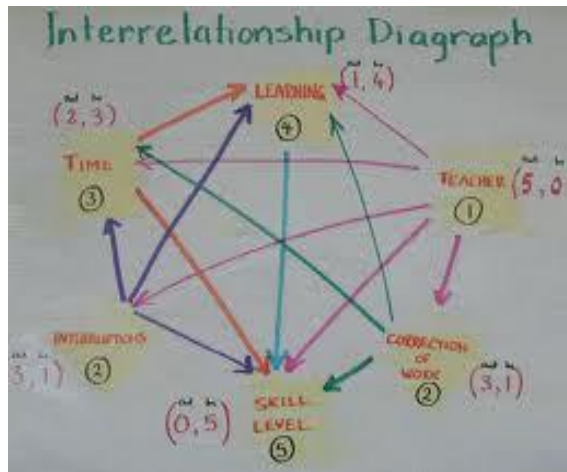
# Interrelationship Diagram

The relations diagram shows cause-and-effect relationships. Just as importantly, the process of creating a relations diagram helps a group analyze the natural links between different aspects of a complex situation.

## **When to Use a Relations Diagram**

- When trying to understand links between ideas or cause-and-effect relationships, such as when trying to identify an area of greatest impact for improvement.
- When a complex issue is being analyzed for causes.
- When a complex solution is being implemented.
- After generating an affinity diagram, cause-and-effect diagram or tree diagram, to more completely explore the relations of ideas.

# Interrelationship Diagram



# Tree Diagram

- The tree diagram starts with one item that branches into two or more, each of which branch into two or more, and so on. It looks like a tree, with trunk and multiple branches.
- It is used to break down broad categories into finer and finer levels of detail. Developing the tree diagram helps you move your thinking step by step from generalities to specifics.

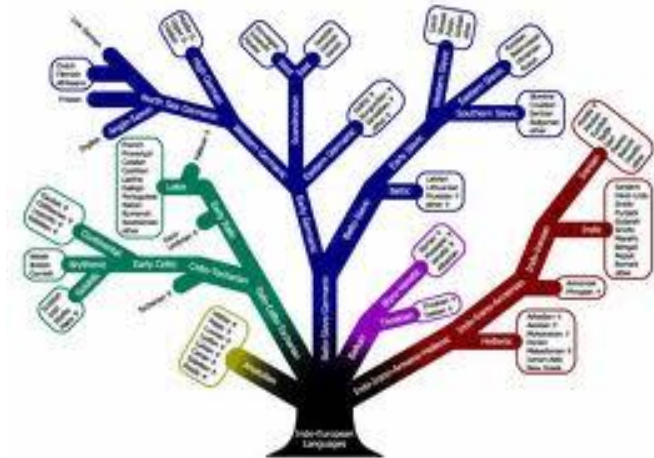
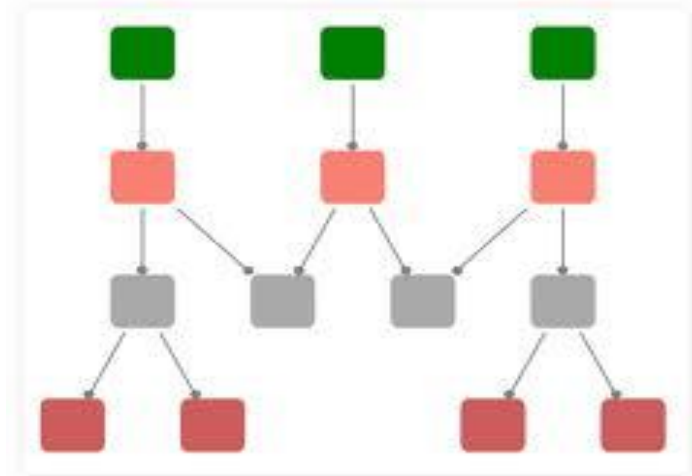
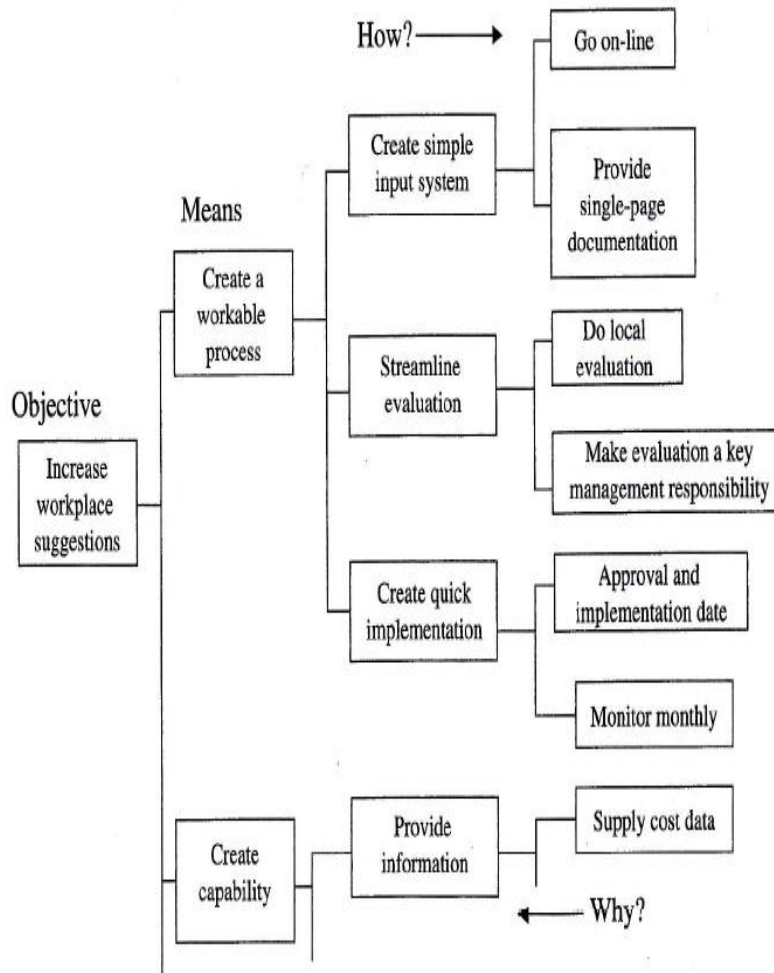
*\*Source: ASQ*

# Tree Diagram

## When to Use a Tree Diagram

- When an issue is known or being addressed in broad generalities and you must move to specific details, such as when developing logical steps to achieve an objective.
- When developing actions to carry out a solution or other plan.
- When analyzing processes in detail.
- When probing for the root cause of a problem.
- When evaluating implementation issues for several potential solutions.
- After an affinity diagram or relations diagram has uncovered key issues.
- As a communication tool, to explain details to others.

# Tree Diagram

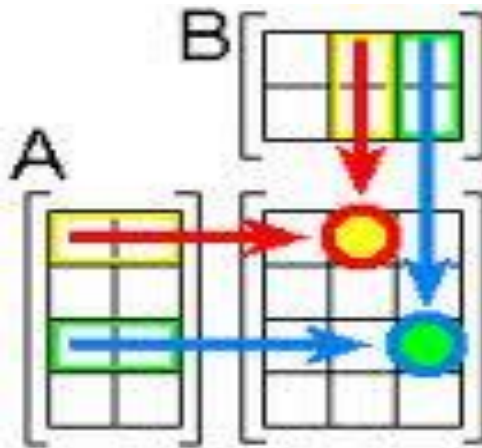




# Matrix Diagram

- The matrix diagram shows the relationship between two, three or four groups of information. It also can give information about the relationship, such as its strength, the roles played by various individuals or measurements.
- Six differently shaped matrices are possible: L, T, Y, X, C and roof-shaped, depending on how many groups must be compared.

# Matrix Diagram



|    |    |    |    |    |  |
|----|----|----|----|----|--|
|    | 1a | 1b | 1c | 1d | ← Variable 1   |
| 2a |    | ⊙  | ⊙  | △  | <p>Typical legend ratings</p> <p>⊙ Primary responsibility ⊙ 9</p> <p>○ Secondary responsibility ○ 3</p> <p>△ Should be kept informed △ 1</p> |
| 2b | △  |    |    |    |  |
| 2c |    | ⊙  | ○  |    |  |
| 2d | ○  |    |    |    |  |
|    |    |    |    |    | ↑ Variable 2   |

The Business Growth Matrix



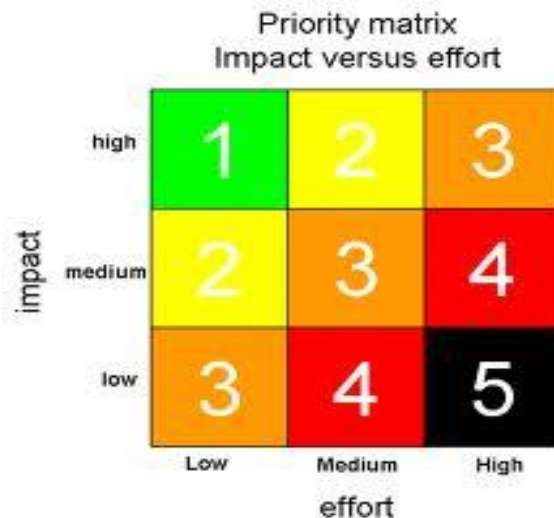
## Task Description

Identify missing or incomplete policies  
 Establish Policies as necessary and ensure adoption globally  
 Completion of necessary Policies  
 Document Policies as appropriate  
 Approve Policies  
 Communicate Policies as required  
 Ensure Policies are compatible with standards and best practice  
 Escalate non standard or missing policies  
 BP: Sponsor with agreement from BPB colleagues decides on exception or not

| Sponsor | Business Owner | Business Program Mgr | Process Manager |
|---------|----------------|----------------------|-----------------|
|         | R              | A                    | R               |
|         | A              | R                    | R               |
|         | R              | A                    | R               |
|         | R              | R                    | A               |
| A       | C              | I                    | I               |
|         | A              | I                    | I               |
|         | R              | R                    | A               |
| R       | R              | R                    | A               |
| A       | I              | I                    | I               |

# Prioritization Matrix

- Tools prioritize issues, tasks, characteristics and so forth, based on weighted criteria using a combination of tree and matrix diagram techniques
- PM are designed to reduce the team's options rationally before detailed implementation occurs



# PDPC

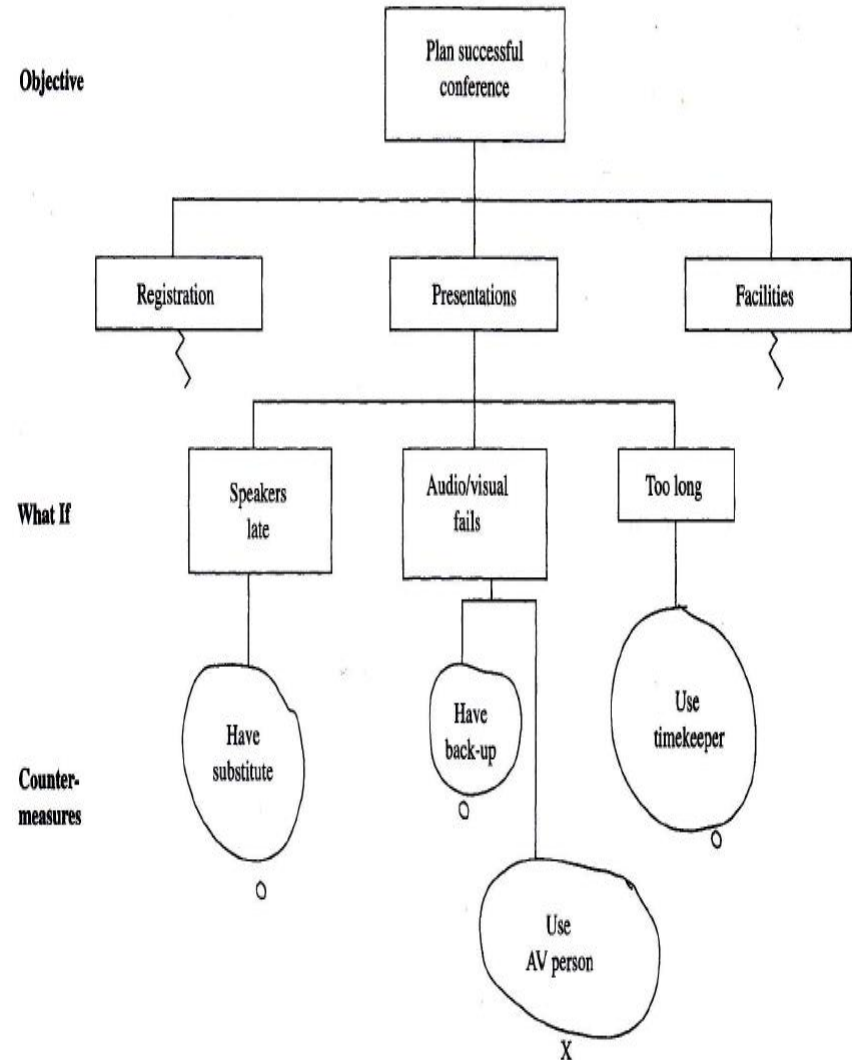
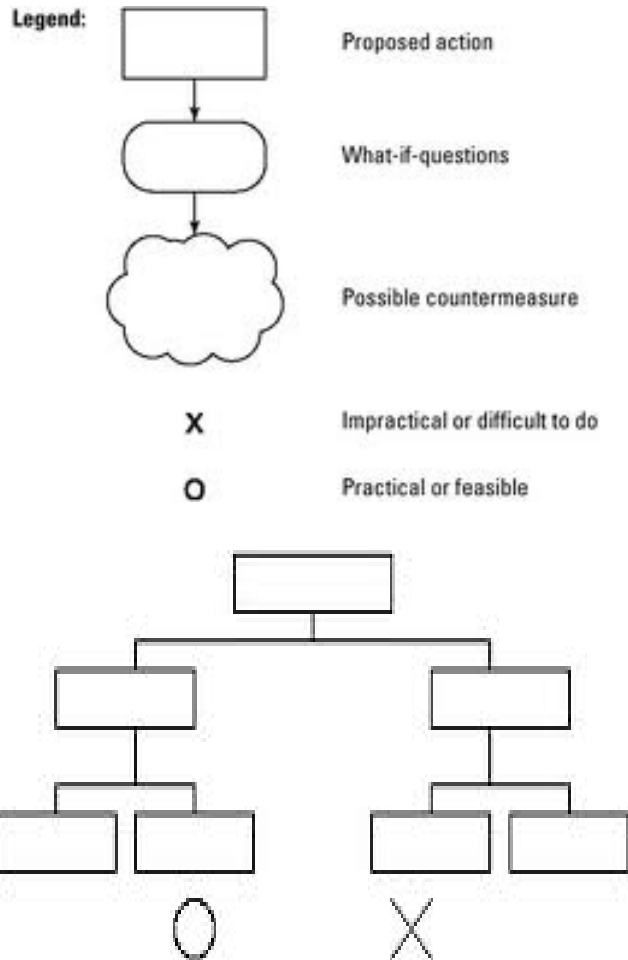
The process decision program chart (PDPC) systematically identifies what might go wrong in a plan under development. Countermeasures are developed to prevent or offset those problems. By using PDPC, you can either revise the plan to avoid the problems or be ready with the best response when a problem occurs.

## **When to Use PDPC**

- Before implementing a plan, especially when the plan is large and complex.
- When the plan must be completed on schedule.
- When the price of failure is high.

*\*Source: ASQ*

# PDPC



# Activity Network Diagram

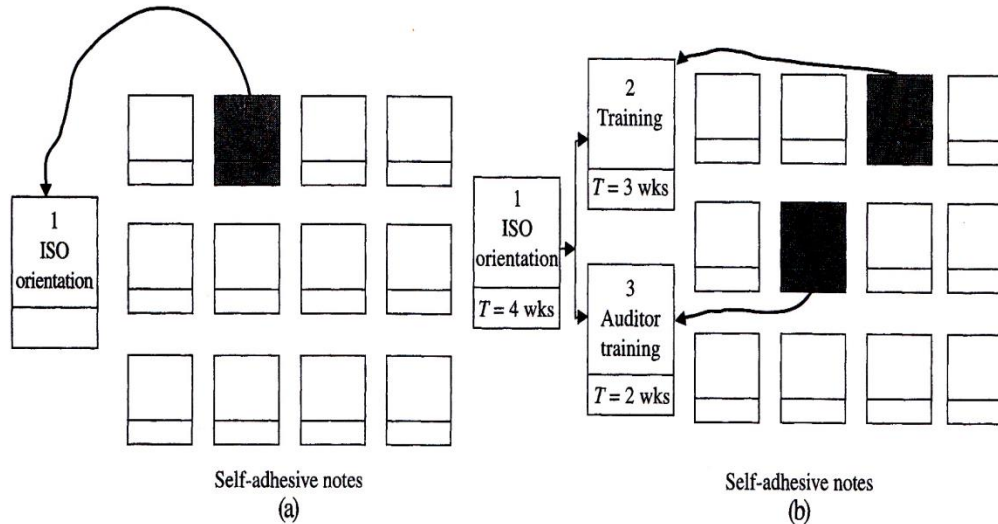
The arrow diagram method establishes a sequenced plan for accomplishing tasks in a project or process.

It maybe represented graphically by either a horizontal or vertical structure connecting the planned activities or events.

Also known as program evaluation and review technique (PERT), critical path method (CPM),

*\*Source: ASQ*

# Activity Network Diagram



Determine the  
critical path

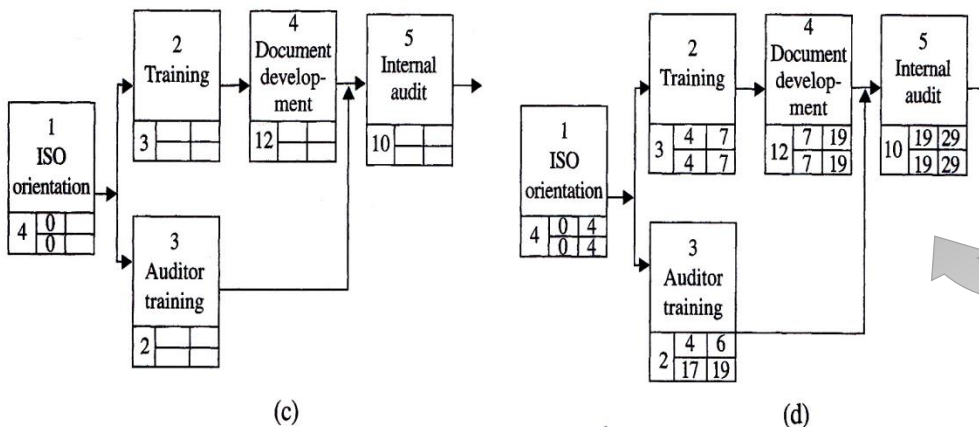


Figure 17-8 Activity Network Diagram

# References

- <http://asq.org/learn-about-quality/idea-creation-tools/overview/nominal-group.html#>