

Indike Manthilake MBA, Msc, Bsc, CSM, PMI-ACP indikem@gmail.com

Lesson 8 – The Project Quality

Agenda

Meeting the requirements with Project Quality Management

Learning Objectives

- Understand the importance of project quality management Projects
- Define project quality management and understand how quality relates to various aspects of projects
- Describe quality management planning and how quality and scope management are related
- Discuss the importance of quality assurance
- Explain the main outputs of the quality control process
- Understand the tools and techniques for quality control, such as the Seven Basic Tools of Quality, statistical sampling, Six Sigma, and testing

Meeting the requirements with Project Quality Management

- Quality typically defines whether stakeholder expectations were met in the project.
- Projects can be on budget, on-time, however if it delivers the wrong products, projects will not mean anything.
- Projects should be delivered according to the specifications defined at the beginning of the project.

What Is Project Quality Management?

- Project quality management ensures that the project will satisfy the needs for which it was undertaken
- Processes include:
 - Planning quality management: Identifying which quality standards are relevant to the project and how to satisfy them; a metric is a standard of measurement
 - Performing quality assurance: Periodically evaluating overall project performance to ensure the project will satisfy the relevant quality standards
 - Performing quality control: Monitoring specific project results to ensure that they comply with the relevant quality standards

Project Quality Management Summary

Planning Process: Plan quality management Outputs: Quality management plan, process improvement plan, quality metrics, quality checklists, and project documents updates Executing Process: Perform quality assurance Outputs: Change requests, project management plan updates, project documents updates, and organizational process asset updates Monitoring and Controlling Process: Perform guality control Outputs: Quality control measurements, validated changes, validated deliverables, work performance information, change requests, project management plan updates, project documents updates, and organizational process asset updates

Project Start

Project Finish

Planning Quality

- Implies the ability to anticipate situations and prepare actions to bring about the desired outcome
- Important to prevent defects by:
 - Selecting proper materials
 - Training and indoctrinating people in quality
 - Planning a process that ensures the appropriate outcome

Who's Responsible for the Quality of Projects?

- Project managers are ultimately responsible for quality management on their projects
- Several organizations and references can help project managers and their teams understand quality
 - International Organization for Standardization (www.iso.org)
 - IEEE (www.ieee.org)

Performing Quality Assurance

- Quality assurance includes all the activities related to satisfying the relevant quality standards for a project
- Another goal of quality assurance is continuous quality improvement. Kaizen is the Japanese word for improvement or change for the better
- Lean involves evaluating processes to maximize customer value while minimizing waste
- Benchmarking generates ideas for quality improvements by comparing specific project practices or product characteristics to those of other projects or products within or outside the performing organization
- A quality audit is a structured review of specific quality management activities that help identify lessons learned that could improve performance on current or future projects

Controlling Quality

- The main outputs of quality control are:
 - Acceptance decisions
 - Rework
 - Process adjustments
- There are Seven Basic Tools of Quality that help in performing quality control

Cause-and-Effect Diagrams

- Cause-and-effect diagrams trace complaints about quality problems back to the responsible production operations
- They help you find the root cause of a problem
- Also known as fishbone or Ishikawa diagrams
- Can also use the **5 whys** technique where you repeated ask the question "Why" (five is a good rule of thumb) to peel away the layers of symptoms that can lead to the root cause

Figure 8-2. Sample Cause-and-

Effect Diagram



Quality Control Charts

- A control chart is a graphic display of data that illustrates the results of a process over time
- The main use of control charts is to prevent defects, rather than to detect or reject them
- Quality control charts allow you to determine whether a process is in control or out of control
 - When a process is in control, any variations in the results of the process are created by random events; processes that are in control do not need to be adjusted
 - When a process is out of control, variations in the results of the process are caused by non-random events; you need to identify the causes of those non-random events and adjust the process to correct or eliminate them

The Seven Run Rule

- You can use quality control charts and the seven run rule to look for patterns in data
- The seven run rule states that if seven data points in a row are all below the mean, above the mean, or are all increasing or decreasing, then the process needs to be examined for non-random problems

Sample Quality Control Chart



Checksheet

- A checksheet is used to collect and analyze data
- It is sometimes called a tally sheet or checklist, depending on its format
- In the example in Figure 8-4, most complaints arrive via text message, and there are more complaints on Monday and Tuesday than on other days of the week
- This information might be useful in improving the process for handling complaints

Sample Checksheet

System Complaints									
	Day								
Source	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total	
Email								12	
Text	₩		#					29	
Phone call								8	
Total	11	10	8	6	7	3	4	49	

Scatter diagram

- A scatter diagram helps to show if there is a relationship between two variables
- The closer data points are to a diagonal line, the more closely the two variables are related

Sample Scatter Diagram



Histograms

- A histogram is a bar graph of a distribution of variables
- Each bar represents an attribute or characteristic of a problem or situation, and the height of the bar represents its frequency

Sample Histogram



Pareto Charts

- A Pareto chart is a histogram that can help you identify and prioritize problem areas
- Pareto analysis is also called the 80-20 rule, meaning that 80 percent of problems are often due to 20 percent of the causes

Sample Pareto Chart



Flowcharts

- Flowcharts are graphic displays of the logic and flow of processes that help you analyze how problems occur and how processes can be improved
- They show activities, decision points, and the order of how information is processed

Sample Flowchart



Run Charts

- In addition to flowcharts, run charts are also used for stratification, a technique that shows data from a variety of sources to see if a pattern emerges
- A run chart displays the history and pattern of variation of a process over time.
- You can use run charts to perform trend analysis and forecast future outcomes based on historical results

Sample Run Chart



Six Sigma

- Sigma (σ)
 - Represent the level of quality that has decided to achieve
 - 6σ is higher quality standard than 3σ
 - 6σ tries to achieve a target of no more than 3.4 defects per million opportunities
 - Used to calculate the upper and lower control limits in a control chart

Number of σ	Percentage of occurrences between two control limits				
1	68.27%				
2	95.46%				
3	99.73%				
6	99.99985%				

What Went Right?

- Motorola, Inc. pioneered the adoption of Six
 Sigma in the 1980s and saved about \$14 billion
- Allied Signal/Honeywell saved more than \$600 million a year by reducing the costs of reworking defects and improving aircraft engine design processes
- General Electric uses Six Sigma to focus on achieving customer satisfaction

Types of Tests

- Unit testing tests each individual component (often a program) to ensure it is as defect-free as possible
- Integration testing occurs between unit and system testing to test functionally grouped components
- **System testing** tests the entire system as one entity
- User acceptance testing is an independent test performed by end users prior to accepting the delivered system

Five Cost Categories Related to Quality

- Prevention cost: Cost of planning and executing a project so it is error-free or within an acceptable error range
- Appraisal cost: Cost of evaluating processes and their outputs to ensure quality
- Internal failure cost: Cost incurred to correct an identified defect before the customer receives the product
- External failure cost: Cost that relates to all errors not detected and corrected before delivery to the customer
- Measurement and test equipment costs: Capital cost of equipment used to perform prevention and appraisal activities

The Cost of Quality

- The cost of quality is the cost of conformance plus the cost of nonconformance
 - Conformance means delivering products that meet requirements and fitness for use
 - Cost of nonconformance means taking responsibility for failures or not meeting quality expectations

Meeting the requirements with Project Quality Management

Cost of Quality (CoQ)

- The total costs that result out of quality activities. The investment made towards preventing:
 - "Non-conformance" to requirements
 - Appraising products/services for "conformance" to requirements



Money spent during the project to avoid failures

Cost benefit analysis

- Looks at the trade offs between quality planning and cost.
- PM weighs the benefits versus the costs of quality efforts to determine the appropriate quality level.
 <u>Benefits of Quality</u>: higher productivity, less rework, lower costs, and increased stakeholder satisfaction.
 <u>Costs of Quality</u>: total cost of quality management activities, such as: quality staff, time allotted for quality activities & tools necessary to conduct these activities.

Modern Quality Management

- Modern quality management:
 - Requires customer satisfaction
 - Prefers prevention to inspection
 - Recognizes management responsibility for quality
- Noteworthy quality experts include Deming, Juran, Crosby, Ishikawa, Taguchi, and Feigenbaum

Philip Crosby

Cost of Poor Quality



- Prevention over Inspection
 - Prevent the defect from occurring will lower the cost and will meet conformance.

Zero Defects

- "Do it right the first time"

Joseph Juran

80/20 Principle

Quality defined as "Fitness for use"

- Means stakeholders and customer's expectations are met or exceeded.
- It means Conformance to specifications



Edwards Deming

Famous for his work in rebuilding Japan



- Plan-Do-Check_Act Cycle
- "14 steps to Total Quality Management (TQM)"
 - Quality is a Management Problem
 - eg: if the management decides to buy low quality material, workers cant be responsible for the quality of the end product.
 - He is the father of TQM
 - TQM says that the Process is the problem, not the people.

Kaoru Ishikawa

- Concept of quality circles
- Fishbone diagrams



- Showed the importance of the seven quality tools:
 - control chart, run chart, histogram, scatter diagram, Pareto chart, and flowchart

Lesson 9 – Organizing and staffing Project Tram

Agenda

- Skill and abilities required for project managers
- Project structure
- Project team