Project Quality Management

Information Technology Project Management, Ninth Edition

What Is Project Quality Management?

- International Organization for Standardization (ISO) definition of quality
  - “Totality of characteristics of an entity that bear on its ability to satisfy stated or implied needs” (ISO8042:1994)
  - “The degree to which a set of inherent characteristics fulfils requirements” (ISO9000:2000)
- Other definitions of quality
  - Conformance to requirements
    - Project’s processes and products meet written specifications
  - Fitness for use
    - Product can be used as it was intended

What Is Project Quality Management?

- Project quality management ensures the project will satisfy the needs for which it was undertaken
- Project quality management processes
  - Planning quality management: identifying which quality standards are relevant to the project and how to satisfy them; a metric is a standard of measurement
  - Managing quality: translating the quality management plan into executable quality activities
  - Controlling quality: monitoring specific project results to ensure they comply with the relevant quality standards

What Is Project Quality Management?

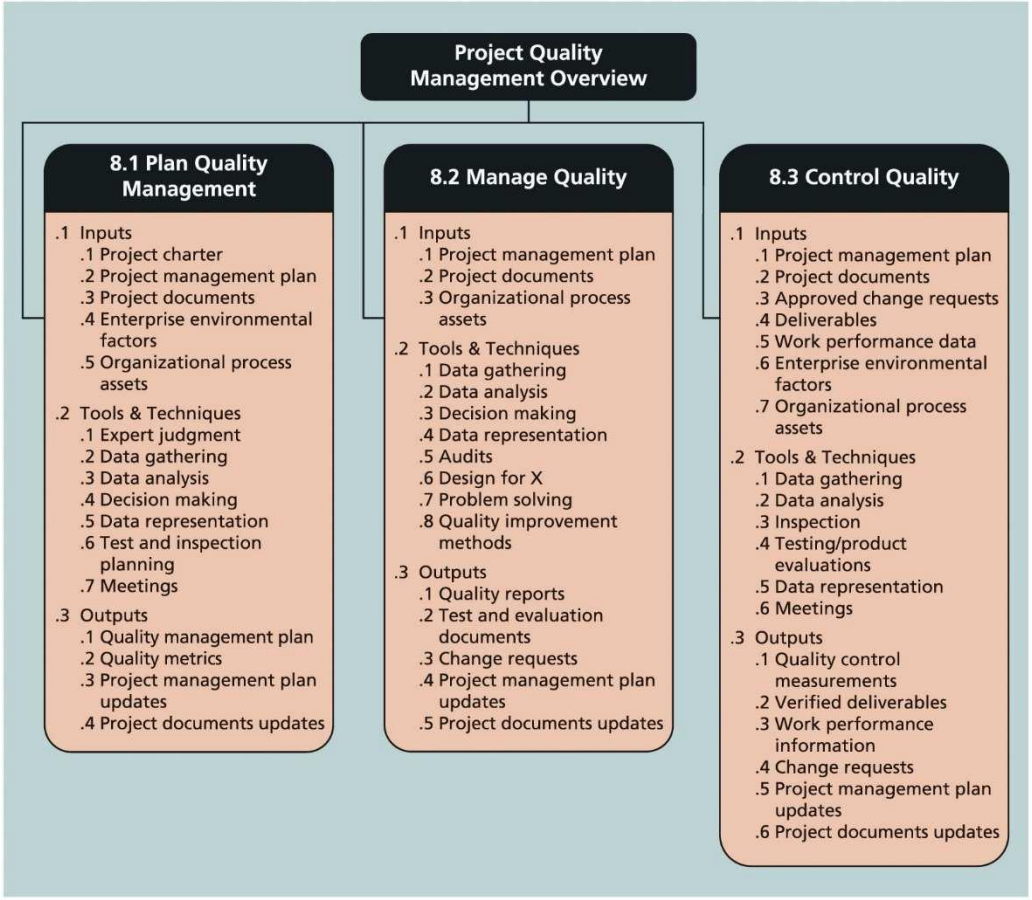

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FIGURE 8-1 Project quality management overview

Planning Quality Management

- Implies the ability to anticipate situations and prepare actions to bring about the desired outcome
- Defect prevention methods
  - Selecting proper materials
  - Training and indoctrinating people in quality
  - Planning a process that ensures the appropriate outcome

Planning Quality Management

- Scope aspects of IT projects
  - Functionality: degree to which a system performs its intended function
  - Features: system's special characteristics that appeal to users
  - System outputs: screens and reports the system generates
  - Performance addresses: how well a product or service performs the customer's intended use
  - Reliability: ability of a product or service to perform as expected under normal conditions
  - Maintainability: ease of performing maintenance on a product
- All project stakeholders must work together to balance the quality, scope, time, and cost dimensions of the project
  - Project managers are ultimately responsible for quality management on their projects

Managing Quality

- Quality assurance includes all the activities related to satisfying the relevant quality standards for a project
  - Another goal 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 process of monitoring and recording results of executing the quality activities to assess performance and recommend necessary changes.

- Main outputs of quality control
  - Acceptance decisions
  - Rework
  - Process adjustments

Tools and Techniques for Quality Control (1 of 9)

- Basic tools of quality that help in performing quality control
  - Cause-and-effect diagrams
  - Control chart
  - Checksheet
  - Scatter diagram
  - Histogram/Bar charts

Tools and Techniques for Quality Control (2 of 9)

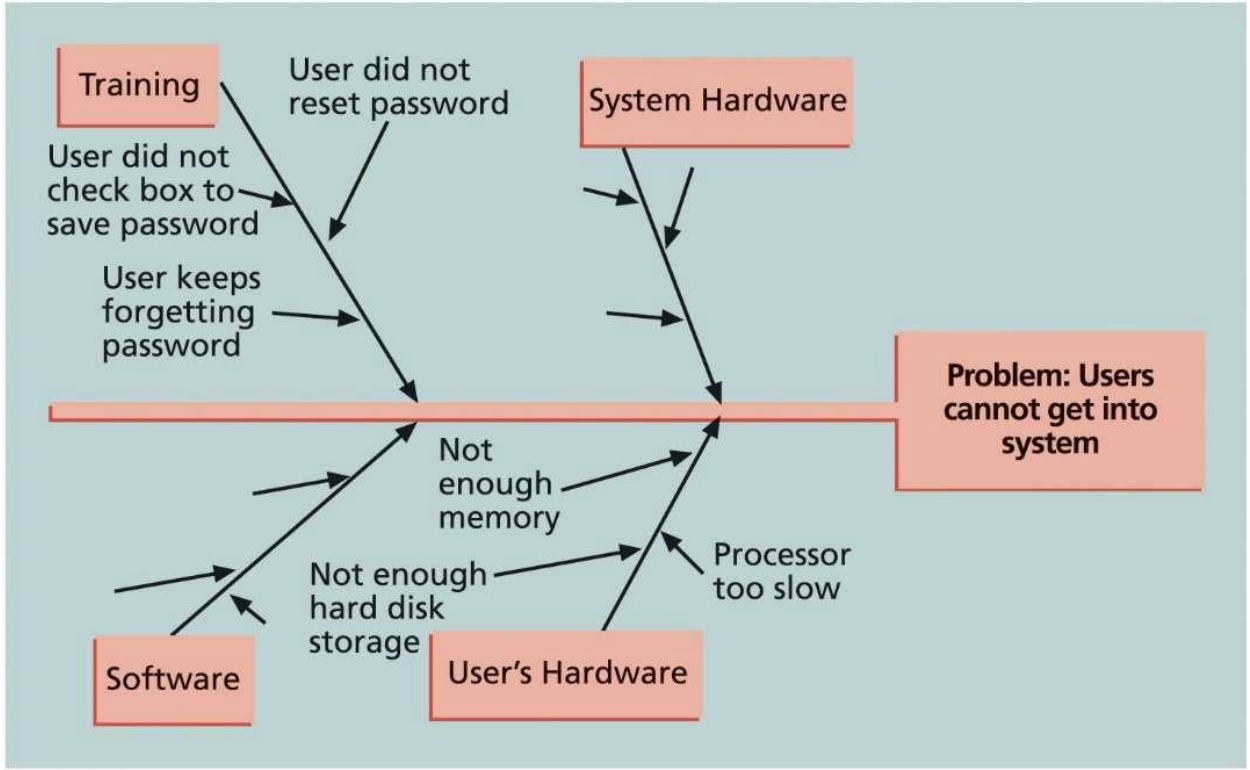


FIGURE 8-2 Sample cause-and-effect diagram

Tools and Techniques for Quality Control (3 of 9)

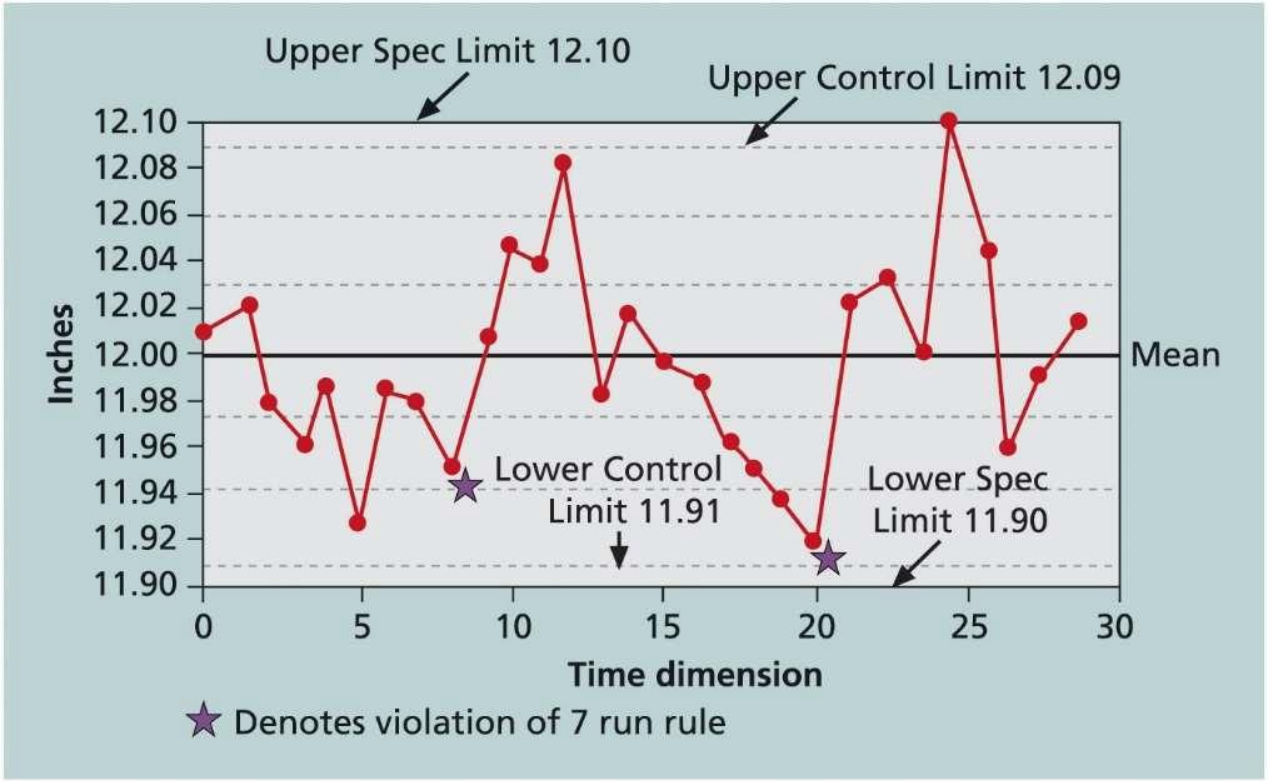


FIGURE 8-3 Sample control chart

Tools and Techniques for Quality Control (4 of 9)

System Complaints

Source	Day							
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
E-mail	𝍸	𝍸	𝍸	𝍸	𝍸		𝍸	12
Text	𝍸	𝍸	𝍸	𝍸	𝍸	𝍸	𝍸	29
Phone call	𝍸	𝍸	𝍸	𝍸	𝍸	𝍸		8
Total	11	10	8	6	7	3	4	49

FIGURE 8-4 Sample checksheet

Tools and Techniques for Quality Control (5 of 9)

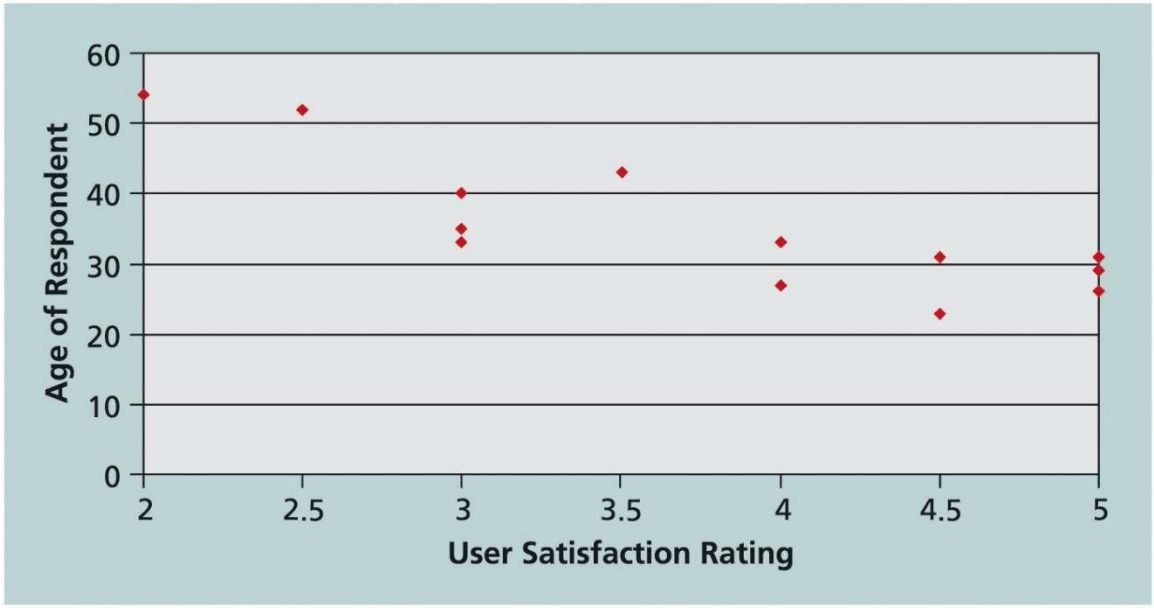


FIGURE 8-5 Sample scatter diagram

Tools and Techniques for Quality Control (6 of 9)

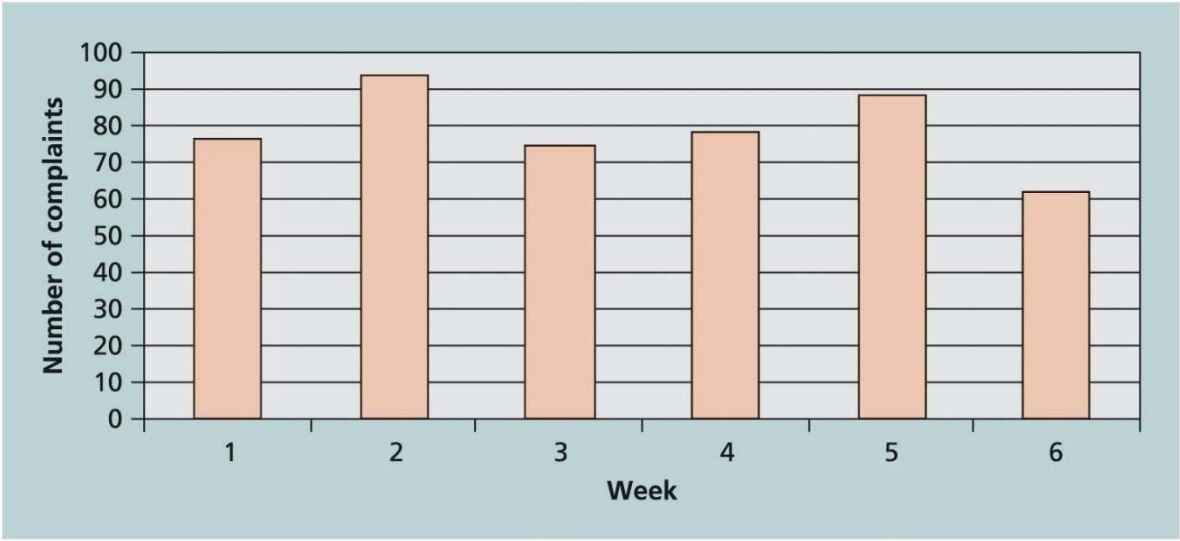


FIGURE 8-6 Sample histogram

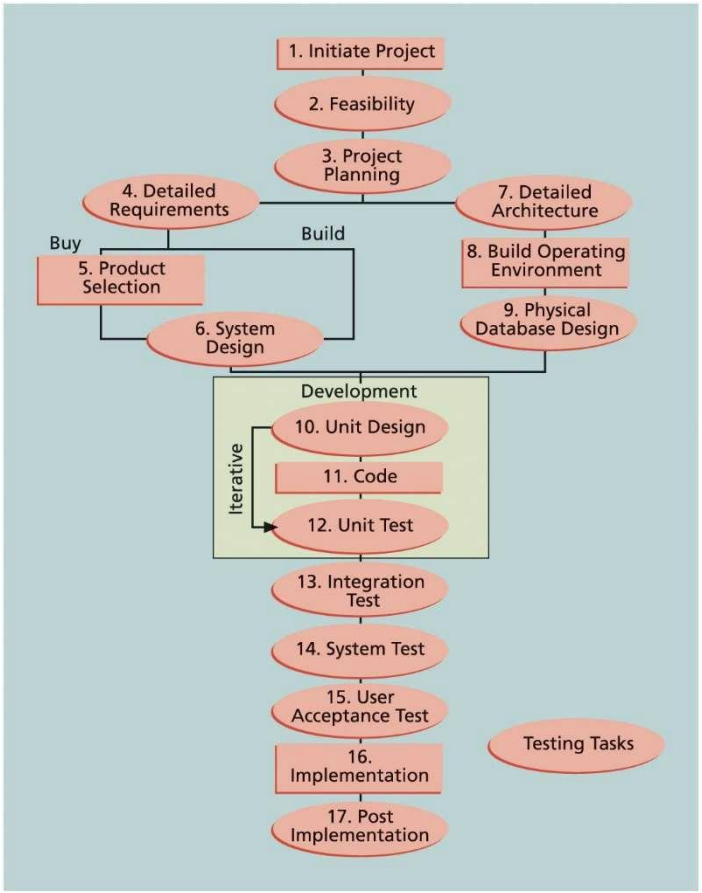
Statistical Sampling

- Choosing part of a population of interest for inspection
  - Size of a sample depends on how representative you want the sample to be
  - Sample size formula
    - Sample size = .25 x (certainty factor/acceptable error)^2

Testing (1 of 4)

- Many IT professionals think of testing as a stage that comes near the end of IT product development
  - Testing needs to be done during almost every phase of the systems development life cycle, not just before the organization ships or hands over a product to the customer

Testing (2 of 4)



Source: Hollstadt & Associates, Inc.

FIGURE 8-11 Testing tasks in the software development life cycle

Testing (3 of 4)

- 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

Testing (4 of 4)

- Testing alone is not enough
  - Watts S. Humphrey, a renowned expert on software quality, defines a software defect as anything that must be changed before delivery of the program
- Testing does not sufficiently prevent software defects
  - The number of ways to test a complex system is huge
  - Users will continue to invent new ways to use a system that its developers never considered
- Humphrey suggests that people rethink the software development process to provide no potential defects when you enter system testing
  - Developers must be responsible for providing error-free code at each stage of testing

The Cost of Quality (1 of 2)

- 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

The Cost of Quality (2 of 2)

- 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

Modern Quality Management

- Modern quality management:
  - Requires customer satisfaction
  - Prefers prevention to inspection
  - Recognizes management responsibility for quality

Modern Quality Management

- ISO standards
  - ISO 9000: a three-part, continuous cycle of planning, controlling, and documenting quality in an organization
  - Provide minimum requirements needed for an organization to meet its quality certification standards
  - Help ensure that projects create products or services that meet customer needs and expectations

Improving IT Project Quality

- Suggestions for improving quality for IT projects
  - Establish leadership that promotes quality
  - Understand the cost of quality
  - Provide a good workplace to enhance quality
  - Work toward improving the organization's overall maturity level in software development and project management

Leadership

- A large percentage of quality problems are associated with management, not technical issues
  - Top management must take responsibility for creating, supporting, and promoting quality programs
- Leadership provides an environment conducive to producing quality
  - When every employee insists on producing high-quality products, then top management has done a good job of promoting the importance of quality

Expectations and Cultural Differences in Quality

- Project managers must understand and manage stakeholder expectations
  - Expectations vary
    - Organization's culture
    - Geographic regions

Using Software to Assist in Project Quality Management

- Software can be used to assist with tools and techniques
  - Spreadsheet and charting software helps create diagrams
  - Statistical software packages help perform statistical analysis
  - Specialized software products help manage Six Sigma projects or create quality control charts

Considerations For Agile/Adaptive Environments

- Agile methods can be used on all types of projects, not just software development
  - Several projects use a hybrid approach where some deliverables are created using more traditional approaches
- Quality is a very broad topic, and it is only one of the ten project management knowledge areas
  - Project managers must focus on defining how quality relates to their specific projects and ensure that those projects satisfy the needs for which they were undertaken

Chapter Summary

- Quality is a serious issue
  - Project quality management includes planning quality management, performing quality assurance, and controlling quality
  - Many tools and techniques are related to project quality management
  - Many people made significant contributions to the development of modern quality management
  - There is much room for improvement in IT project quality
  - Several types of software are available to assist in project quality management