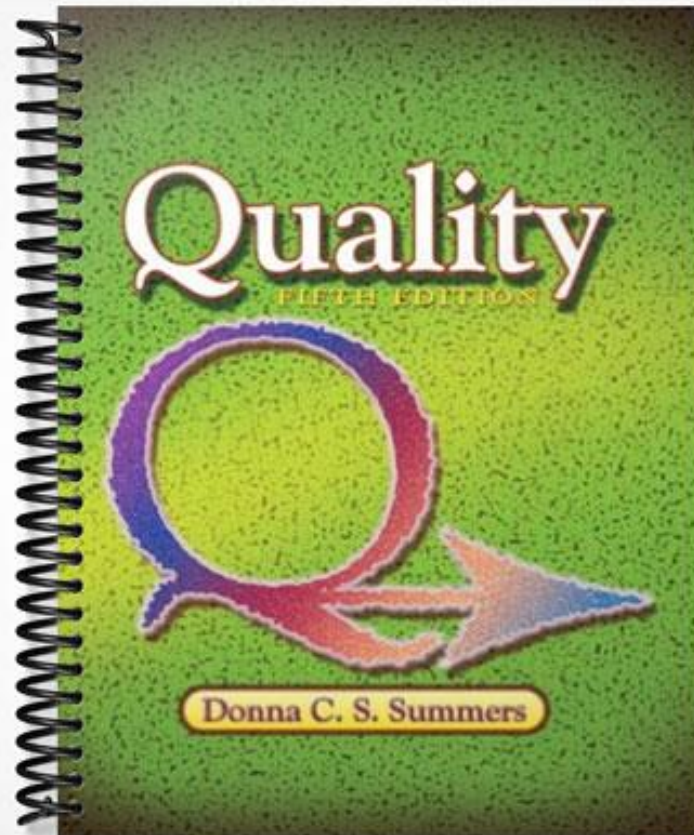


**SOLUTIONS MANUAL**



**Online Instructor's Manual**  
*to accompany*

**Quality**  
**Fifth Edition**

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## Chapter 1

- 1.2 Feigenbaum's definition is very comprehensive and focuses on the customer. Deming's definition of quality, 'non-faulty systems' appears to be narrow on the surface, however, to have a non-faulty system, the system must meet the expectations as identified by the customer(s), thus enabling us to link to Feigenbaum's definition. The definition presented by ASQ has several similarities to Feigenbaum's including quality as a subjective term, each person having their own definition of quality, ability to satisfy stated or implied needs and being free from deficiencies.
- 1.3 Customer determination: replacement muffler is new, not used, that it is needed.  
Actual experience: does the muffler muffle? Service?  
Requirements: Service at time of replacement? On time? As promised?  
Technically operational: does the muffler fit the car?  
Entirely subjective: cleanliness of shop? Courtesy of service people?
- 1.4 Clock: actual experience: what does the customer want or need from clock  
Stated/unstated: tells time/decorative  
Conscious/merely sensed: dimensions/nice face on clock  
Technically operational/subjective: keeps time/sound of ticking  
Grocery: actual experience: customer need for grocery  
Stated/unstated: organic/wide variety  
Conscious/merely sensed: type of food/five senses reaction to food  
Technically operational/subjective: item availability/types of offerings  
Doctor: actual experience: patient's actual experience at doctor's office  
Stated/unstated: sterile equipment/clean environment/infection control and staff that cares about infection risk  
Conscious/merely sensed: answers to questions/bedside manner  
Technically operational/subjective: able to prescribe medicine/able to suggest lifestyle changes.
- 1.5 For example: Quality is defined by the customer's actual experience with the product or service. What did they think they wanted before the experience? What did they think after they interacted with the product or service? Did they feel they achieved value for their time and money? Productivity refers to the effectiveness with which things get accomplished, how well are resources used.
- 1.6 Customer determination: does the clean clothing meet the expectations of the customer?  
Actual experience: Does the clothing feel, smell, look clean while wearing?  
Requirements: clean, pressed clothing  
Technically operational: clean, pressed, no damage  
Entirely subjective: Does the clothing look, smell, feel good?
- 1.7 See Figure 1.3
- 1.8 Specification: A document that states the requirements to which a given product or service must conform.  
Tolerances: the amount of variation allowed from a standard.

Inspection: Measuring, examining, testing, or gauging one or more characteristics of a product or service and comparing the results with specified requirements to determine whether conformity is achieved for each characteristic.

Prevention: Prevention refers to those activities designed to prevent non-conformances in products and services.

1.9 Inspection occurs after the fact, the product has been produced, the service has been provided. Quality control goes beyond inspection in that statistical records are kept, but again, this information is gathered after a problem has occurred. It is not a proactive method of ensuring the quality of a product or service. Statistical quality control expands on the concept and performs statistical analysis on the information gathered to determine whether or not improvements can be made to the product or service. It is only when a company practices statistical process control that the company focuses on being proactive in the face of quality issues. Information is used to improve the way a product is produced or a service is provided. In total quality management the proactive philosophy is expanded and applied to all areas of the company.

1.10 Inspection: Normally occurs at the completion of a product or service. The product or service is compared against a standard and judged as good or bad.  
 Quality Control: Firms practicing quality control review their products or services by comparing them with specifications. This information is used to design, produce, review, and improve the item's quality.  
 Statistical Quality Control: Practitioners use statistical data to analyze and solve problems.  
 Statistical Process Control: SPC focuses on process improvement in order to eliminate defects.  
 Total Quality Management: TQM focuses on achieving customer satisfaction through system and process improvement.  
 Continuous Improvement: Companies taking this approach are interested in improving systems and processes in order to continually provide value for their customers.

1.12 Example Specifications:

Item	Specification
Room Cleanliness	2 sets of clean towels
Room Cleanliness	Room vacuumed daily
Pool Cleanliness	No towels/debris around pool area
Pool Cleanliness	Correct Ph

1.13 Wanamaker treats bases quality on the customer's actual experience with the product or service (return the goods and get their money back). Wanamaker considers the customer's value determination which relates to Feigenbaum's customer's needs stated or unstated, conscious or merely sensed, technically operational or entirely subjective.

## Chapter 2

- 2.1 The three purposes of Dr. Shewhart's control charts are: to define standards for the process, to aid in problem-solving efforts to attain the standards, and to serve to judge if the standards have been met. These three purposes work together during an integrated problem-solving process. The first purpose, defining standards, sets the expectations for the process. The third purpose, judging if the standards are met, is used to determine if the process is capable of meeting the expectations placed on it. If the process is not capable, then the second purpose, to aid in problem-solving efforts, comes into play as the charts are used to determine the root causes associated with the processes' inability to meet specifications.
- 2.2 Deming's fourteen points interact by creating an integrated and systematic method of approaching the management of an organization. This method is grounded in the philosophy of constantly and forever improving the business of providing goods and services. While the fourteen points do not tell a company how to run every aspect of its business, they do provide guidelines which support the development of company-specific management systems grounded in continuous improvement.
- 2.6 Little q has a focus on the product, manufacturing, and the person buying the product. Its focus is narrow. Big Q, on the other hand focuses on the products and services as well as any processes involving the customer. The customer is anyone who interacts with the product or service. Big Q requires a larger focus on how we do the work we do and what is involved in our business.
- 2.7 Juran's approach to quality is described by his Trilogy of quality: quality planning, quality control and quality improvement.
- 2.8 The steering arm sets direction, monitors progress, removes barriers and provides resources to those solving the problems (the diagnostic arm). The diagnostic arm carries out the steps of quality problem solving: investigation, root cause determination, propose potential solutions, implementation, and measurement of success.
- 2.9
- A. Crosby's definition of quality: conformance to requirements
  - B. Crosby's system of quality: prevention of defects
  - C. Crosby's performance standard: zero defects
  - D. Left to the reader.
- 2.10 Customer satisfaction centers on how the customer felt the last time he or she bought a product or service from an organization. It is a comparison between customer expectations and customer experience. A successful customer is one who receives a product or service that meets his or her expectations the first time. When a customer is merely satisfied, steps may have been taken to rework or redo the product or service until the customer is happy. In the action of satisfying a customer whose expectations weren't met the first time, the company may have incurred quality costs.

- 2.11 Crosby's erroneous assumptions:  
 Quality is goodness, luxury.  
 Quality is the responsibility of the quality control department.  
 Quality is intangible and not measurable.  
 Quality problems begin with the operator.  
 There is an "economics of Quality."
- 2.12 Dr. Deming: Constancy of purpose/Continuous improvement/Institute training  
 Dr. Juran: Quality Improvement/Steering arm provides resources for improvement/Big Q  
 Crosby: Economics of Quality/prevention of defects.
- 2.13 Taguchi's loss function describes the difference between focusing on a target (the center of the specification) and focusing on the tolerance (the allowable spread). A company that fails to focus on the target and allows the process to vary between tolerance limits faces loss. This loss exists because the product or service is varying from the desired target. For instance, if a cereal box is supposed to hold 12 ounces, if it holds more than 12 ounces, the company loses money. If it holds less than 12 ounces, the customer won't be happy because they are shorted cereal.
- 2.14 The traditional approach to quality emphasizes conformance to requirements, usually a specification with +/- limits. The Taguchi Loss Function points out that any deviation from the target specification results in a loss.
- 2.15 Dr. Deming's Red Bead experiment is a tool which describes the effects of processes and variation on worker performance. With the experiment, Deming is able to show that processes and systems can create situations where an employee can be performing to the best of their ability, yet still not be able to perform to a high standard, because the process is not providing appropriate input. The experiment also shows the effect of variation on a process.
- 2.16 Dr. Deming's Funnel experiment shows how randomly adjusting the process can lead to poorer quality. The focus should be on the target, the process should be allowed to settle down to its normal operating level, then the process can be examined for potential improvements that will enable it to achieve the target each time. Read Real Tools for Real Life example about tampering with the process.
- 2.17 Dr. Deming's system of profound knowledge has four parts:  
 An appreciation for a system  
 Knowledge about variation  
 Theory of knowledge  
 Psychology

An appreciation for how a system works is key to improvement. People working with the system must understand how the different parts of a system interact in order to produce a product or provide a service. Once this is understood, the entire system can be optimized and made more effective.

Knowledge of variation enables a problem solver to understand whether or not they are dealing with common cause or special cause variation. Improvements made to remove common cause variation from the system involve changing processes, changing the way work gets done. Special cause variation requires specific changes to prevent the special cause from happening again. Theory of knowledge means that the person has an understanding of the how the process is performing. Knowledge comes from using performance measures to monitor the process and any process changes. Measures can reveal trends, patterns, and other anomalies.



Psychology refers to the need to understand people and how they interact with each other.

- 2.18 a. Doctors: actual experience: doesn't want patient to get sick from other bacteria  
Stated/unstated: sterile equipment/clean environment/infection control  
Conscious/merely sensed: sterile equipment and good hygiene/ overall hospital cleanliness and employee compliance with hand washing requirements  
Technically operational/subjective: antibacterial soap/how long washing takes
- Nurses: actual experience: doesn't want patient to get sick from other bacteria  
Stated/unstated: sterile equipment/clean environment/infection control  
Conscious/merely sensed: sterile equipment and good hygiene/ overall hospital cleanliness and employee compliance with hand washing requirements  
Technically operational/subjective: antibacterial soap/how long washing takes
- Patients: actual experience: doesn't want to get sick from other bacteria  
Stated/unstated: sterile equipment/clean environment/infection control and staff that cares about infection risk  
Conscious/merely sensed: sterile equipment and good hygiene/ overall hospital cleanliness and employee compliance with hand washing requirements  
Technically operational/subjective: antibacterial soap/how long washing takes
- b. Several common causes would be: weakness of patients so they are susceptible to bacteria, existence of bacteria due to the very nature of hospital, number of visitors and patients in hospital who could transmit disease.
- c. Several assignable causes would be: no sinks in room, broken sinks in room, no towels or soap in room, no training in hand washing techniques.
- d. Institute leadership. Leadership must stress the importance of this problem by providing funding and support and holding people accountable for making improvements.
- e. Little q focuses on the small processes within a single area. Big Q focuses on the overall picture. Big Q takes a larger view of the situation and would institute a hospital wide improvement program to solve this problem.
- f. The economics of quality. Here the economics of quality can be clearly quantified as the costs of treating patients who contract other diseases or illnesses. Their deaths, loss of work time, suffering can all be quantified. These costs can be used to counterbalance and justify improvements.