

FREE LESSON

Huritt Global Business School for Entrepreneurship through its online courses provided by HGBSE Online in partnership with ED2GO is giving potential students the opportunity for a free online lesson. Because of our collaboration with a manufacturing association group in Nigeria, we have chosen a free lesson from the *Six Sigma: Total Quality Fundamentals*.

Six Sigma: Total Quality Fundamentals

There are twelve lessons for the Six Sigma: Total Quality Fundamentals. In this free lesson, “*Introduction to Quality*” we are giving you the opportunity to see and have a feel of the instructor and how he presents the lessons. Tony Swaim is the instructor for all of our manufacturing and operations courses, and some of the project management courses.

The following is the list of the twelve lessons for *Six Sigma: Total Quality Fundamentals*:

Lesson Title

- Course Pretest (Optional)
- 1 Introduction to Quality
- 2 Customers and Organization
- 3 Nonquality Costs and Variation
- 4 Assessment and Leadership
- 5 Motivation and Change
- 6 Team Building and Training
- 7 TEI and Measuring Performance
- 8 Standards and Auditing
- 9 External and Internal Auditing
- 10 ISO 9000
- 11 More Standards and Systems
- 12 Quality Culture and Fallacies
- Final Exam Released:
- Final Exam Due:

Free Lesson

Lesson 1: Introduction to Quality

Chapter 1

Introduction

Hello everyone, and welcome to *Total Quality Fundamentals*. My name is Tony Swaim, and I will be your guide through this online course. I've been an online instructor since 1998. Prior to this, I was an adjunct professor and worked as a materials manager for several medical device manufacturing companies. My goal is to help you learn to be more effective using the fundamentals of quality at your organization. I have been associated with quality management for more than 15 years and have helped hundreds of students develop quality systems, increase customer satisfaction, and reduce costs.

Your success as a quality ambassador depends not only on how you perceive your position in your organization but also on how well you interact with other departments, top management, suppliers, and customers. In this course, you will learn how to add value to your organization by mastering the various dimensions of quality, understanding the essence of teamwork, increasing compliance, and reducing variation.

By the time you finish the last lesson, you will know about the quality movement, understand the difference between Six Sigma and total quality management (TQM), and realize why prevention is much more desirable than appraisal. You'll have a grasp of the importance of customer orientation (and know how it relates to quality), understand how a quality organization is created, and recognize how vital teamwork really is. You'll know the principles of auditing and determine how quality standards (including ISO 9000) contribute to your organization's success. Finally, you'll learn how to implement a quality culture.

To get the most out of this course, I hope you'll share your questions and ideas with your classmates and with me in the Discussion Area. If you haven't taken the time to introduce yourself, please post a message for us today. To access the Discussion Area, simply scroll to the top of this page and click **Discussion** in the upper-right corner.

Let's start learning about Six-Sigma: Quality Fundamentals. In Lesson 1, we'll discuss professional quality certification, the American Society for Quality (ASQ), and define quality. We'll explore the history of the quality movement and introduce Six Sigma. We'll also examine TQM and discuss its components and concepts.

Chapter 2

An Overview of Quality

Let me begin with a bit of history. Before the late 1970s, most of the world barely focused on quality. Then eyes shifted. Starting in the late 1980s and moving through the early 1990s, quality got everyone's attention, and formal quality standards were put in place. From the mid-1990s to present day, the drive for quality has leveled off. Six Sigma and ISO 9000 are today's major quality initiatives.

Despite the presence of Six Sigma and ISO 9000, not enough people discuss quality with the same gusto today as in the 1980s and early 1990s. This may mean that quality has become second nature or that management's attention is on other things. The fact that many companies overly rely on final inspection tells me that there is still a room for improvement.

Someone once said that quality is a journey that has no end. I agree with that. It's important that we continue to move forward. Companies can't become content because they believe they've journeyed far enough.

One way to keep up with quality trends is to be part of a quality society.

One of my purposes for this course is to help you prepare for—and pass—the American Society for Quality's (ASQ) Manager of Quality/Organizational Excellence (CMQ/OE) exam. So let's talk briefly about the exam and ASQ.

ASQ's CMQ/OE credential provides a reference point for quality practitioners to compare their knowledge to what ASQ considers important.

The test consists of approximately 150 questions taken from *ASQ's body of knowledge*. To learn more about the quality manager body of knowledge, visit ASQ's Web site and type CMQ/OE *body of knowledge* in their search field.

If you want to know more about the CMQ/OE exam, please use the link in the Supplementary Material section after the lesson. This link provides basic information about ASQ, where you can also search for information on the CMQ/OE. I recommend that you download the body of knowledge and study guide from ASQ's site. It is also helpful if you purchase a quality control and statistics textbook.

Why is the CMQ/OE credential so sought after?

If you review employment ads, you'll see that many companies want people with quality credentials. In fact, some employers make it a minimum condition for certain positions. Many firms require a CMQ/OE credential before someone can become a manager. Now, not everyone passes the CMQ/OE exam the first time, so don't be downcast if you have trouble. The test is tough. But your diligent studying will only increase your knowledge, and it will pay off. When you see the words: "Congratulations. You passed the exam!" on your letter from ASQ, you'll know you accomplished something special. Let's look at ASQ's background.

ASQ began in Milwaukee, Wisconsin, in 1946 as the American Society for Quality Control (ASQC). ASQC came together as a result of a merger between 17 regional quality societies. Today ASQ (they dropped the *control* part in the 1990s) has more than 100,000 members. In addition to the Certified Quality Manager credential, ASQ offers Certified Quality Engineering (CQE), Certified Quality Auditor (CQA), Certified Quality Technician (CQT), and many other certifications.

When you join ASQ you will receive many benefits—a monthly magazine, access to a members-only Web site, a local chapter newsletter, member discounts on conferences, and much more. There is an almost endless amount of information at ASQ's site, so make sure to check it out.

Now that you know about ASQ, let's talk about how to define quality.

We can define quality in many ways. When I asked my neighbor to define it, he said, "I don't know how to put it into words exactly, but I know quality when I see it." Quality has a number of dimensions. You can reflect it in grades (good, better, or best) or functions (guaranteed not to leak; works the first time and every time).

Perhaps the most encompassing definition of quality is in terms of requirements, design, and conformance.

Requirements refer to what customers expect. If you don't define customer requirements correctly, your design and conformance to the design won't satisfy customers. After you define requirements, you need to *design* how your product will work and also determine how to convert your design (perhaps a blueprint) into products and services that customers want. *Conformance* refers to making sure that you adhere to your design, every step of the way. The best design will be of little use if your execution is poor.

When you put it all together, you attain quality by knowing what products customer want, understanding how they should be made and work, and also making sure that they are made properly.

Other words to describe quality are *appearance* ("I love my shiny new red convertible"), *operation* ("This vacuum cleaner bag is so easy to change"), *reliability* ("I've had it for eight years, and it's never quit on me"), and *value* ("I bought the same item at the outlet store for 30% less"). You can also define how well a product or service meets its intended purpose, how well you satisfy customers, and how many defects are present.

The main thing to remember is that customers (not engineers or marketers) define quality. They do this based on their experience with a product or service and by measuring against requirements (which may be poorly stated and ever-changing). Let's agree that quality is a total customer satisfaction package that includes repeatability of performance, safety, serviceability, and a good value for the money.

Now that everyone has a pretty good idea of what quality is, let's talk about its history and review Six Sigma.

Chapter 3

The History of the Quality Movement and Six Sigma

Think for a moment about the pyramids in Egypt and Mexico. Do you ever wonder about the construction of these miracles in stone? It's likely that workers used brute force to carry out the master builders' detailed plans.

By contrast, consumer products from a few hundred years ago—such as clothing, furniture, and wagons—had a different story. They were made using many of the concepts advocated by today's quality gurus, such as quality at the source, don't pass on a known defect, pride of work, and training must come first.

Workers needed to finish long apprenticeships before they began to work. Since a skilled worker knew the design and how products worked and also had complete control of the process, quality was practically guaranteed every step of the way. If part A of a piece of furniture did not fit properly with part B, work would cease until it did. But typically, it fit because of the artisans' expertise.

During the 1800s, the Industrial Revolution came along and many things changed, some for better and some for worse. During this era, machines began to make other machines, and many inventions appeared on the scene (the steam hammer, electricity, and railroads).

The good side was the abundance of new products made faster and for less cost. The bad side was the demise of the artisan. A key phrase that appeared during the Industrial Revolution was *specialization of labor*. Instead of making an entire piece of furniture, an artisan (now called a laborer) was in charge of making just a single leg. Chances were that the artisan-laborer would never again see a finished piece of furniture (unless he happened to buy one or visited the warehouse). This destroyed the pride of work. After all, it's hard to become enthused when all you do every day is make furniture legs.

The responsibility for quality shifted from an artisan with big picture knowledge to plant managers who didn't have much sophistication about quality. They didn't know how to achieve quality, nor did they care much about it. Their primary focus was on production. Make as much as possible, keep workers busy, run those machines, and bring in that money!

High-tech innovations came fast and furious. Consumers didn't give too much thought to product choices, because the new products were so much better than what they previously bought. Although they realized the new products had bugs, they just learned to live with them.

As production volumes grew and products became more complex, quality suffered. A lack of trained workers aggravated things. Someone had to do something.

To reduce the number of rejects, it was necessary to assess products before they left the factory. Many firms began to inspect every unit before they shipped them. Because of the high cost of making a bad finished product, companies began to inspect products earlier in the process—all the way back to suppliers. Unfortunately, acceptable criteria were unclear.

Due to this lack of clarity, firms had to use precious engineering time to evaluate rejected products and materials.

All was not bad, however.

A few individuals were rays of bright light in the midst of this era typified by high-volume production and quality problems.

Walter Shewhart, working at Bell Telephone Laboratories in the 1920s, came up with *statistical process control* (SPC) and using control charts. Shewhart's work is the basis of today's use of variation. A few years later, two giants of quality, W. Edwards Deming and Joseph Juran, continued Shewhart's work. Then Armand Feigenbaum popularized total quality control (later changed to *total quality management*—TQM) in 1961, and Phil Crosby coined the notion that *quality is free* in his book of the same title in 1979.

Extending the work of these quality pioneers is Six Sigma. Let's see what it's all about.

Six Sigma is both a philosophy and a methodology used to improve quality, reduce costs, and increase customer satisfaction. Organizations around the world use Six Sigma to measure and improve a company's practices, systems, and performance. It identifies and prevents defects to meet and exceed expectations.

Motorola introduced Six Sigma in 1987. Interestingly, this was the same year that ISO 9000 and the Malcolm Baldrige National Quality Award were introduced. Motorola's success with Six Sigma was so significant that the company was awarded the Baldrige Award in 1989. General Electric and Allied Signal have also used Six Sigma to great benefit during the 1990s. ASQ reports that firms have saved billions of dollars since its inception because of implementing Six Sigma.

At first glance, you may believe that Six Sigma is just another name for TQM. While it's true that Six Sigma shares many concepts with TQM, it represents a more powerful response to organizational problems. It incorporates many of the concepts introduced by the quality gurus. You wouldn't be too far off base if you considered Six Sigma as TQM on steroids.

Six Sigma begins with customer orientation, uses data, focuses on processes, applies project management methods, and drives for excellence. Statistically, Six Sigma means that for every million units you produce, you generate less than four (3.4 to be exact) defects. Few companies reach the coveted Six Sigma level. Remember, quality is a journey that has no end.

Today many companies mobilize resources to capitalize on Six Sigma. For example, one of my former employers has reassigned many employees as Six Sigma Black Belts (experts) and has set up a training institute at their corporate headquarters. Perhaps your company will be next to embrace and adopt Six Sigma.

Now let's spend time exploring what I consider to be the heart and soul of quality—TQM.

Chapter 4

An Introduction to TQM

We need to begin by considering the essence of TQM. It began as *total quality control*. I've also seen it called *total quality*, *continuous improvement*, and *quality*. What we call something is not that important. The underlying concepts are what I want to emphasize. I need to make sure you realize that TQM is not a program, because that indicates that it has an end point. TQM never ends, so I prefer the term *TQM process*.

According to Feigenbaum's 1961 book, TQM stands on several pillars: employees must pull together to (1) meet or exceed customer needs, (2) minimize variation, (3) achieve reliability and consistency, and (4) aggressively improve processes—forever. A vital concept from his book is the notion of an internal customer.

Let's see how Feigenbaum defined TQM.

The elements of TQM are reflected in its title: *total*, *quality*, and *management*. The first element—the *total* part—means that everyone at your firm plays a role and believes in what TQM represents and what it does. TQM covers processes that employees own—outputs for both external and internal customers and inputs from suppliers.

Getting everyone involved is often a major challenge, because some people will be resistant. They may view TQM as just "another flavor of the month," meaning that it will come and go just like so many other programs. Someone once told me that at their company, the president made an energetic speech about TQM, but after two days, it sagged to the earth like a deflated balloon. Others may say, "TQM is exactly what manufacturing and quality control needs to get into shape. But I work in finance; TQM is not for me." Not so fast. Remember, TQM is for all employees.

I don't think we need to spend any more time on defining *quality*, the second element of TQM. We discussed quality at length earlier today in Chapter 2.

The third element—*management*—may be the most important. Here's how I view the management component of TQM.

First, top management must understand TQM, provide training for all, include all employees (especially finance), and perhaps most importantly, set a good example. Employees watch new ideas such as TQM very carefully to see if top management is really committed or if they are using the old, "Do as I say, not as I do" routine. An inconsistency between what they say and what they do creates a credibility gap that undermines TQM in no time flat. Management must "talk the talk and walk the walk."

But TQM is more than just a top-down plan. Management must occur at every single level of your organization. Employees must manage themselves, and each person needs to manage one another. So self-management and helping your colleagues manage is essential. Before we go on, let me explain what I mean by *manage*.

I have a cube on my desk that I received from a management workshop a few years ago. The words *planning*, *organizing*, *leading*, and *controlling* are on four sides on the cube. The other two sides have the name of my company and the workshop title. While this is not a class in management, it's vital that we examine its four elements:

1. **Planning.**

Planning is a key activity because it sets the stage for all subsequent activities. It identifies what you want to accomplish and how you are going to get there.

Planning consists of two things: (1) a hard-copy plan that states what you want to accomplish and (2) the process you use to create your plan—brainstorming, reviewing data, and discussing the pros and cons of potential actions. Of the two, the process is the more important. After your hard-copy plan is long forgotten (crammed into a desk drawer or placed on a shelf collecting dust), the steps you need to take will be a guiding light.

Examples of planning in TQM are the development of a mission statement, a continuous process improvement plan, and the TQM plan itself. Allow sufficient time for your TQM implementation. It may take a few years before TQM is firmly in place.

When you use TQM, all employees need to plan. Asking people to plan is often an eye-opener, since many have never developed a plan. Their standard practice is to either wait until someone tells them to do something or to react to situations. The good news is that with sufficient training, practice, and encouragement, just about anybody can learn to plan.

2. **Organizing.**

Organizing uses a systematic approach to define the structure and sequence of the work that you need to do. There is a strong relationship between organizing and planning, because if you don't know what you want to do and how you are going to do it, it's pointless to become organized. TQM benefits from a specific type of organization that we'll discuss later in the course.

3. **Leading.**

Leading people is a challenge. A common situation is that too many people want to take a leadership position or, paradoxically, no one wants to. When you use TQM, people can lead in different ways, such as heading up a project, chairing a meeting, setting a good example, expressing an unpopular (but needed) opinion, or helping a team member.

4. **Controlling.**

Control is a word that rubs many people the wrong way. It conjures up images of your boss breathing down your neck, just waiting for you to slip up and make a mistake so she can correct you. This is a harsh way to view control. I like to think of it as getting what you expect. When your plans come true, you need little or no control.

A more formal definition of control is setting a standard, comparing results to a standard, and taking corrective action. Corrective action could involve taking steps to improve performance, reducing the standard, or doing both.

Planning and control have a close relationship. Without planning there can be no control, because there is no standard to measure against.

Control plays a major role in quality because of its original name—*total quality control*. But remember, use it carefully and exercise the right level of control based on your specific case.

Now that we have a good grasp of TQM, let's identify and discuss its fundamental concepts:

1. **Improve processes, constantly and forever.**

A few years ago, a senior buyer told me, "No matter what I do for the boss, it's never enough." I hate to say it, but I have to side with the boss on this one, although the boss should also give positive feedback. People who want to maintain the status quo don't help organizations grow. Employees in TQM organizations need to continually improve processes.

2. **When you make mistakes, use them as learning experiences.**

Of all the TQM concepts, this is the hardest one to follow. People have a tendency to be overly self-critical, so they usually don't welcome mistakes. Also, many (most?) bosses are not very forgiving when things go wrong.

TQM requires fundamental change. As your company moves forward, people will make missteps as they try new things. Hopefully, your goofs won't bankrupt your firm.

And one more thing, your company doesn't operate in a vacuum; both suppliers and customers play a big role in your success. So share quality concepts with them and help them establish TQM.

Chapter 5

Conclusion

Great job today! You learned about professional quality certification, the American Society for Quality (ASQ), and the various definitions of quality. You traced the history of the quality movement, found out how Six Sigma differs from TQM, and learned how TQM contributes to overall organizational success.

I'll see you in Lesson 2, where we'll discuss quality objectives, customer focus, and quality systems. Take care.

Note: If you have enjoyed this free lesson and want to enroll for the course, please click on the link. <http://hgbseonline.com/Manufacturing%20and%20Operations.htm>

Supplementary Material

American Society for Quality (ASQ)

<http://www.asq.org>

Read the various articles—updated frequently.

What Is Six Sigma?

<http://www.ge.com/6sigma/6sigmstrategy.html>

Learn about Six Sigma, the General Electric way. As you review this site, pay special attention to the glossary link.

Deming Network

<http://deming.org>

This Web site will tell you about one of our quality heroes.

FAQs

Q: I'm uncertain as to which of the certifications offered by the American Society for Quality (ASQ) I should pursue. I currently work as a quality inspector and am interested in moving into supervision and management. What would you suggest?

A: The Certified Quality Manager certification is your best bet. It covers a wide body of knowledge and is directed toward establishing an effective quality system. Since you desire to move into supervision and management, this certification should help you achieve your career goals.

Good luck!

Assignment

You'll need a notebook to record your responses to this assignment and the ones to follow. At the end of the course, as you thumb back through your answers, you'll be amazed at how much you've learned.

At your present or previous organization, how do you perceive the company's commitment to quality? Do you believe they emphasize it less than before, and if so, why? (Note: If you've never been employed, relate this information to a school that you've attended or to a company that you know about.)

For this assignment and all future ones, make sure to review the information in the Supplementary Material section.

Lesson 1 Quiz

You can take this quiz as many times as you wish. Use the quizzes to test your knowledge of each lesson before you take your final exam. Your quiz scores do not have any impact on your eligibility for a completion letter. Your final exam score alone determines your eligibility to receive a completion letter. Because you only have one opportunity to take the final exam, we strongly recommend that you prepare for the final by doing as well as you can on these quizzes.

1. How did the Industrial Revolution change the role of an artisan regarding quality?
 - It did not change the role. It continued as before.
 - The artisan became responsible for total quality.
 - The artisan was only responsible for a small piece of the process.
 - The artisan assumed a leadership role in quality.
2. What era reflects a high attention to quality activities?
 - The Industrial Revolution.
 - Before the late 1970s.
 - Beginning in the late 1980s and continuing through the early 1990s.
 - From the mid-1990s to the present.

3. Which of the following quality pioneers conceived SPC?
- Walter Shewhart.
 - W. Edwards Deming.
 - Armand Feigenbaum.
 - Phil Crosby.
4. How does planning relate to TQM?
- Top management performs planning.
 - It produces a hard-copy plan, which is the most vital TQM ingredient.
 - It comes after the organization step.
 - The planning activity is used as a guiding light for TQM actions.
5. How is control best used in TQM?
- As a standardized form of corrective action.
 - As a prerequisite for planning.
 - As a way to reprimand employees who make mistakes.
 - As a way to get what you expect.

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