1.2 Statistics and Quality

"Statistical thinking is critical to improvement of a system."

—Mary Walton, *The Deming Management Method*

Definition

Process

A **process** is a series of actions that changes inputs to outputs.

The idea of a **process** is closely tied to quality control. We encounter processes in all facets of our lives. A simple credit card transaction is a process—the customer inserts or swipes the card, the number is digitally read from the card, there is a credit authorization procedure, and then finally the credit card is approved or rejected for the amount of money that the customer intended to spend. In a business context, a process is a series of steps that produces a product or service. Closely monitoring and continuously improving processes produce high quality products. Monitoring the process means taking measurements of key variables over time. Improving processes means reducing process variation by finding the causes of variation and eliminating them.

Definition

Statistical Process Control

Statistical Process Control (SPC) is a group of statistical methods designed to monitor and control processes.

In order to improve a process there must be an understanding of how the process is currently performing. This requires definition and monitoring of the process. Statistics helps with decisions about how the data will be collected, what data will be needed, and the analysis of the data. In addition to ferreting out production problems, **Statistical Process Control** (SPC) is a group of statistical methods designed to monitor and control processes. SPC is helpful in detecting problems in a process before they create a defective product or service. We will study this subject more extensively in chapter 18.

1.2 Exercises

Basic Concepts

1. Describe the role of statistics in the quality movement.
2. What is a process?
3. How are processes improved?
4. What is SPC?

Exercises

5. **a.** Describe a process at your school or place of employment.

   b. In your opinion, how could this process be improved?

   c. What type of data could you collect to use in analyzing this process?

1.3 Descriptive Statistics versus Inferential Statistics

The science of statistics is divided into two categories, **descriptive** and **inferential**. Descriptive methods describe and summarize data, while inferential methods aid in drawing conclusions and making decisions and predictions about populations and processes for which it is impractical to obtain measurements on each member.

Descriptive Statistics

The emphasis in **descriptive statistics** is analyzing observed measurements, usually from a sample. With descriptive statistics we try to answer questions such as: