

Assignment 4 (MBA 693)

Submission guidelines:

- The assignment is a case study, and you can use either Excel or JMP to complete it. If you are using Excel, submit your Working Excel Sheet with the Report, if you are using JMP, submit your output screenshots in the Report Word File.
- If you submit multiple files, only the file with the latest time stamp would be graded.
- Label your work clearly.
- The data file is labelled “**Quality**” and is available on Canvas.

Case Study

Quality Associates, Inc., a consulting firm, advises its clients about sampling and statistical procedures that can be used to control their manufacturing processes. In one particular application, a client gave Quality Associates a sample of 800 observations taken while that client’s process was operating satisfactorily. The sample standard deviation for these data was 0.21; hence, with so much data, the population standard deviation was assumed to be 0.21. Quality Associates then suggested that random samples of size 30 be taken periodically to monitor the process on an ongoing basis. By analyzing the new samples, the client could quickly learn whether the process was operating satisfactorily. When the process was not operating satisfactorily, corrective action could be taken to eliminate the problem. The design specification indicated that the mean for the process should be 12. The hypothesis test suggested by Quality Associates is as follows:

$$H_0: \mu = 12$$

$$H_0: \mu \neq 12$$

Corrective action will be taken any time H_0 is rejected.

The samples listed in the following table were collected at hourly intervals during the first day of operation of the new statistical process control procedure. These data are available in the file Quality.

Managerial Report

1. Conduct a hypothesis test for each sample at the **0.01 level of significance** and determine what action, if any, should be taken. Provide the test statistic and p value for each test.

2. Compute the standard deviation for each of the four samples. Does the conjecture of 0.21 for the population standard deviation appear reasonable?
3. Compute limits for the sample mean around μ such that, as long as a new sample mean is within those limits, the process will be considered to be operating satisfactorily. If exceeds the upper limit or if is below the lower limit, corrective action will be taken. These limits are referred to as upper and lower control limits for quality-control purposes.
4. Discuss the implications of changing the level of significance to a larger value. What mistake or error could increase if the level of significance is increased?