



The Lighthouse

April 2004

Elyria/Lorain Section 814

Mission Statement

To advance community and member quality excellence thorough educational opportunities, non-competitive information exchange, networking, forming alliances and leadership growth



CQE CLASS

We will be having a CQE course for the upcoming test on June 5th 2004. The deadline for applying for the test is April 9th. The classes will be held one night a week on Thursday from 6:00 PM - 9:00 PM at Lorain Community College and start April 8th. You can still register for the class. However, you will not receive the Primer or other materials on the first day of class.

Meeting Announcement - April 7, 2004

Networking @ 6:00 PM. Meeting @ 6:30 PM

8th The Law Of The Bad Apple - Rotten Attitudes Ruin a Team Against All Odds - Statistics Episode - 7. Models for Growth

Presentation of a law of the 17 Indisputable Laws of Teamwork by John Maxwell. Following that presentation, we will have a group discussion regarding that law and how it applies or should apply in our respective organizations.

After the discussion, we will be presenting the "Against All Odds" series. This episode will cover "Time Series". Statistics can reveal patterns over time. Using the concept of seasonal variation, this program shows ways to present smooth data and recognize whether a particular pattern is meaningful. Stock market trends and sleep cycles are used to explore the topics of deriving a time series and using the 68-95-99.7 rule to determine the control limits.

Chair's Message

Remember in last month's newsletter that I said. " The Vernal Equinox (i.e. Spring) is coming. Hurray!" Well I hope everyone is progressing along well on the construction of their ark.

"...the length of the ark shall be three hundred cubits, the breadth of it fifty cubits, and the height of it thirty cubits." Most scholars believe the cubit to have been no less than 18 inches long [45.72 centimeters]. This means that the ark would have been at least 450 feet long [137.16 meters], 75 feet wide [22.86 meters] and 45 feet high [13.72 meters]. Noah's Ark was said to have been the largest sea-going vessel ever built until the late nineteenth century when giant metal ships were first constructed. Its length to width ratio of six to one provided excellent stability on the high seas. In fact, modern shipbuilders say it would have been almost impossible to turn over. In every way, it was admirably suited for riding out the tremendous storms in the year of the flood.

These dimensions are especially interesting when compared to those given in the mythical, Babylonian account of the Ark. Here the ark is described as a perfect cube, extending 120 cubits

in all directions and with nine decks. Such a vessel would spin slowly round and round in the water and from the standpoint of stability, would be a disaster.

But was the ark big enough to hold the number of animals required? The total available floor space on the ark would have been over 100,000 square feet, which would be more floor space than in 20 standard-sized basketball courts. Assuming an 18-inch cubit [45.72 centimeters], Noah's Ark would have had a cubic volume equal to 569 modern railroad stock cars.

Let's assume 50,000 animals, far more animals than required, were on board the ark, and these need not have been the largest or even adult specimens. Remember there are really only a few very large animals, such as the dinosaur or the elephant, and these could be represented by young ones. Assuming the average animal to be about the size of a sheep and using a railroad car for comparison, we note that the average double-deck stock car can accommodate 240 sheep. Thus, three trains hauling 69 cars each would have ample space to carry the 50,000 animals, filling only 37% of the ark. This would leave an additional 361 cars or enough to make 5 trains of 72 cars each to carry all of the food and baggage plus Noah's family of eight people.

The Ark had plenty of space.

CQE CLASS (Cont.)

You must have eight years of on-the-job experience in one or more of the areas of the Certified Quality Engineer Body of Knowledge. A minimum of three years of this experience must be in a decision-making position. "Decision-making" is defined as the authority to define, execute, or control projects/processes and to be responsible for the outcome. This may or may not include management or supervisory positions.

If you are now or were previously certified by ASQ as a Quality Auditor, Reliability Engineer, Software Quality Engineer, or Quality Manager, experience used to qualify for certification in these fields applies to certification as a Quality Engineer.

If you have completed a degree from a college, university, or technical school with accreditation accepted by ASQ, part of the eight-year experience requirement will be waived, as follows (only one of these waivers may be claimed):

Diploma from a technical or trade school—one year will be waived

- Associate degree—two years waived
- Bachelor's degree—four years waived
- Master's or doctorate—five years waived

To apply for the test contact ASQ headquarters directly. The cost for the test is \$180 for members and \$285 for non-members. To apply for the class contact me. The cost for the class is \$400. The payment for the test needs to be sent to ASQ headquarters. The payment for the class needs to be made out to "ASQ Section 0814" and given to me the first night of class.

Please check out our web site at www.eriecoast.com/~asq0814. Currently it only contains the newsletter but hopefully it will also soon have additional pages. If you have ideas for content please contact myself or any member of the executive committee.

We would like your input into what additional courses you would like to see offered. Please e-mail your suggestions at haessly@myepath.com.

Your Executive Committee

Position	Name	e-mail
Chair/Education Chair	Michael Haessly	Haessly@myepath.com
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Statistics Corner

by Michael Haessly

The t-test is a very powerful tool for determining the statistical difference in means between two sample populations. However, did you know that the accuracy of that test is also effected by the sample size of the two populations being evaluated. For example take 5 piece samples from two populations with a mean of 0 and 1 and both having a standard deviation of 1. The t-test will show a significant difference at a 90% confidence level approximately 35% of the time. If the sample size is increased to 20 pieces the t-test will show a significant difference at a 90% confidence level approximately 85% of the time. If the sample size is increased to 80 pieces the t-test will show a significant difference at a 90% confidence level approximately 98% of the time.

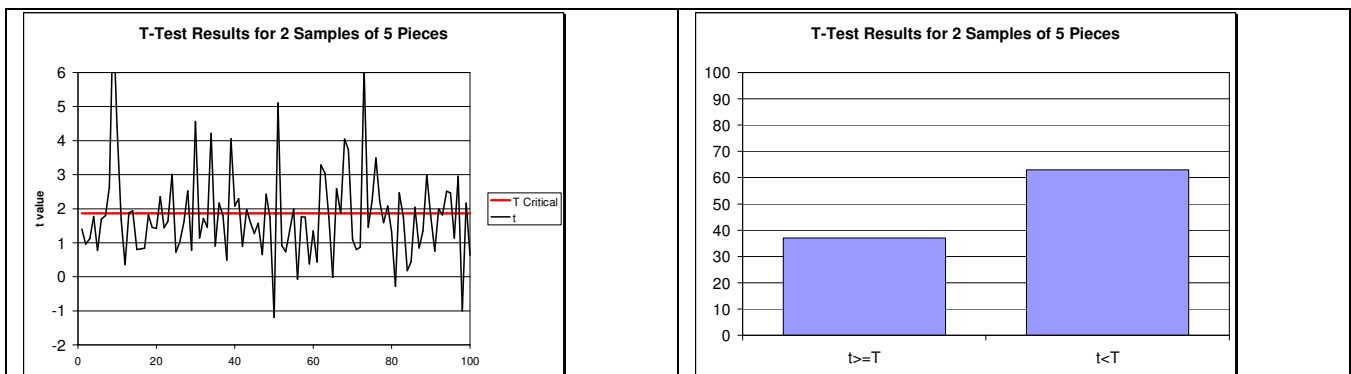
What causes this is the stabilization of the mean and standard deviation of the samples as the sample size increases. The equation for the t statistic, assuming normality and equal variances is shown below.

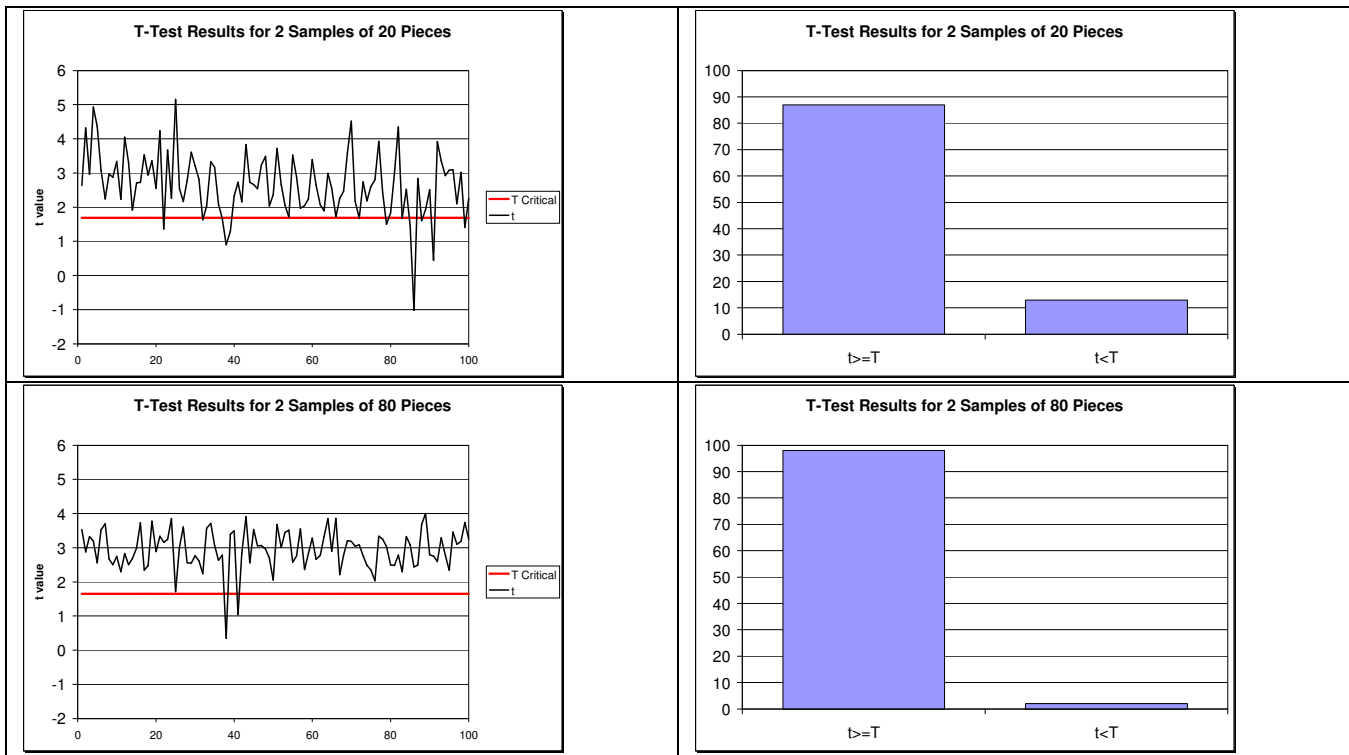
$$t = \frac{(\bar{x}_1 - \bar{x}_2) - d_0}{s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

where

$$s_p^2 = \frac{s_1^2(n_1 - 1) + s_2^2(n_2 - 1)}{n_1 + n_2 - 2}$$

The variable d_0 is the assumed difference in the two sample means. For these calculations it was assumed that the difference in the means was zero. From these equations one can see that the pooled standard deviation s_p decreases with increasing sample sizes. Also as one knows that as the sample size increases the variability in the mean and standard deviation of the samples decreases. Shown below are graphs showing the variability in the t statistic and the number of cases where $t \leq T$ critical and the number of cases where $t > T$.





This shows that sample size is important in determining the accuracy of the t-test and why there are recommended equations for the choice of sample size for testing means. This is also just one example of how you can use Excel to assist you in the understanding of statistics.

Statistics Humor These Were The "Good Old Days" In Statistics

WHEN an instructor spent a third of a course teaching the computation of the mean and standard deviation from a grouped frequency distribution and then apologized to the student that these were only approximations.

WHEN a real luxury was owning a \$150 Texas Instrument hand-held calculator that could perform the four fundamental operations.

WHEN a student complained about math anxiety the instructor could compassionately recommend completing a one-week regimen of a paperback programmed-instruction book stressing the mathematics necessary for basic statistics.

WHEN angrily dropping a jammed 50 lb Frieden rotary calculator to the floor would magically restore the machine to full operation.

WHEN performing a Wherry-Doolittle multiple regression on a rotary calculator produced only a weary statistician.

WHEN a bulky \$3000 Monroe programmable electronic calculator was regrettably limited to 32 steps and would just barely compute a standard deviation.

WHEN your Nixie-tube Sony programmable desktop calculator was the envy of the entire department.

WHEN using the mainframe computer for analyzing data necessitated punching Hollerith cards on a humungous 8 ft. wide steel contraption and then storing 100's of these cards in long cardboard boxes which could be lugged from building to building.

WHEN students were awestruck with the notion of an ANOVA replacing six pairwise t-tests to test the equality of four treatment population means.

WHEN the spirit duplicator ("ditto") machine made you appreciate the dangers of glue sniffing and had you begging for a box of latex gloves to protect your hands from the purple plague.

WHEN nonparametric tests which were the rage of the 1950's were likened to the discovery of penicillin and forced you to question even the most minute violation in the assumptions of parametric tests and subsequently toss many t or F-tests on the junk heap.

WHEN students were convinced that there was only one unique table of random numbers and were dumbfounded when they did a frequency count of single digits in the table and found them roughly rectangularly distributed rather than normal.

The Lighthouse - Calendar 2003-2004

Elyria/Lorain Section 814

Newsletter/Meeting Schedule

Meetings at Holiday Inn, Elyria (by the mall) 6:00 PM - 9:00 PM

Newsletter	Meeting	Teamwork Topic	Against All Odds
September 1, 2003	September 10, 2003	1. THE LAW OF SIGNIFICANCE - One Is Too Small a Number to Achieve Greatness	1. What Is Statistics?
October 1, 2003	October 8, 2003	2. THE LAW OF THE BIG PICTURE - The Goal Is More Important Than the Role	2. Picturing Distributions
November 1, 2003	November 12, 2003	3. THE LAW OF THE NICHE- All Players Have a Place Where They Add the Most Value	Speaker Jim Yost
December 1, 2003	December 10, 2003	4. THE LAW OF MOUNT EVEREST - As the Challenge Escalates, the Need for Teamwork Elevates	3. Describing Distributions
January 1, 2004	January 14, 2004	5. THE LAW OF THE CHAIN - The Strength of the Team Is Impacted by Its Weakest Link	4. Normal Distributions
February 1, 2004	February 11, 2004	6. THE LAW OF THE CATALYST - Winning Teams Have Players Who Make Things Happen	5. Normal Calculations
March 1, 2004	March 10, 2004	7. THE LAW OF THE COMPASS - Vision Gives Team Members Direction and Confidence	6. Time Series
April 1, 2004	April 7, 2004 (NOTE CHANGE)	8. THE LAW OF THE BAD APPLE - Rotten Attitudes Ruin a Team	7. Models for Growth
May 1, 2004	May 12, 2004	9. THE LAW OF COUNTABILITY - Teammates Must Be Able to Count on Each Other when it Counts	8. Describing Relationships
June ,1 2004	June ,9 2004	PICNIC	PICNIC
	2004-2005	Laws 10-17	Episodes 9 - 26

This program is open to all Section members and their associates or friends. You don't have to purchase the text book or workbook to participate but to truly apply the principles they are a must. The cost is \$34 for the Book and \$26 for the Workbook or \$44 for both for each participant. (Pay at the meeting, make check out to Elyria/Lorain Section #0814). You may also order them online at www.injoy.com. The prices above include a \$5 handling fee for the section.

(Note: any missed laws will be made up at a TBA).

Leadership Program Disclaimer: Dr. John C. Maxwell is a Pastor and does reference his religious experience to provide examples for the laws. We selected Dr. Maxwell because of the quality of his leadership training program not his religion. Therefore ASQ National nor our Section #0814 promote his or any other religion and only provide this opportunity for our members, and/or associates to help you move along your leadership trail.

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ASQ

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MEETING: April 7, 2004