Reasons for No Longer Teaching the Normal Approximation Confidence Interval

John N. Zorich, Jr., Ohlone College

A typical, modern-day introductory statistics textbook teaches normal approximation confidence interval formulas for use with large samples and exact formulas for small samples. Other than tradition, there is no compelling theoretical, practical, historical, or educational reason for calculating confidence intervals using relatively inaccurate normal-distribution approximation formulas instead of exact ones based upon exact distributions (Student’s \( t \) for variable data, and binomial for proportions). Although ease-of-computation for large sample sizes was a valid concern many decades ago, that is no longer the case, given the present-day availability of statistical software, statistical functions in electronic spreadsheets, and textbooks with tables covering degrees of freedom greater than 30. In this 21st century, normal approximation formulas are way past their expiration dates and are a liability to 21st century students who work in a world where product quality is no longer measured in defects per thousand but in defects per billion.

Keywords: confidence intervals, \( z \)-table, \( t \)-table, normal approximation confidence interval, binomial proportion

**John N. Zorich, Jr.** (johnzorich@yahoo.com) received an MS degree in botany from the University of California, Davis, in 1979. He has worked in medical-device design and manufacturing as an independent statistical consultant and instructor since 1999. Annually since 2005, he has taught a course in introductory and applied statistics for the Biotechnology Center of Ohlone College (Newark, CA). Previously, he taught courses in applied statistics at Silicon Valley Polytechnic Institute and for the Silicon Valley ASQ Biomedical Division and is currently a periodic guest lecturer in applied statistics in the graduate program of Biomedical Engineering at San Jose State University. He currently resides near Houston, TX.