

CHEM 3600 Assessment—Fall, 2004

During the Fall semester 2004, CHEM 3600 (Quantitative Analysis) was administered a standardized final exam on Analytical Chemistry. The test was designed and made available by the American Chemical Society. (ACS) USU CAB will use it to determine USU student performance versus national statistics. National norms as provided by the ACS are based on 703 student scores from 38 colleges. The standardized exam is composed of 50 questions covering all topics typically taught during a semester of Quantitative Analysis. Students are given 100 minutes to complete the exam. No penalty for incorrect answers is applied, so students are encouraged to answer all questions. The national data exhibits the following statistics with regard to the raw score (questions correct): Mean=28.5, Standard Deviation=7.6, Median=29.0.

USU students as a whole exhibited no significant statistical difference from the national norms. For the Fall 2004 semester, students who took the Quantitative Analysis course (n=47) showed the following statistics: Mean=29.1, Standard Deviation=7.3, Median=28.0. A histogram of the USU population is shown below.

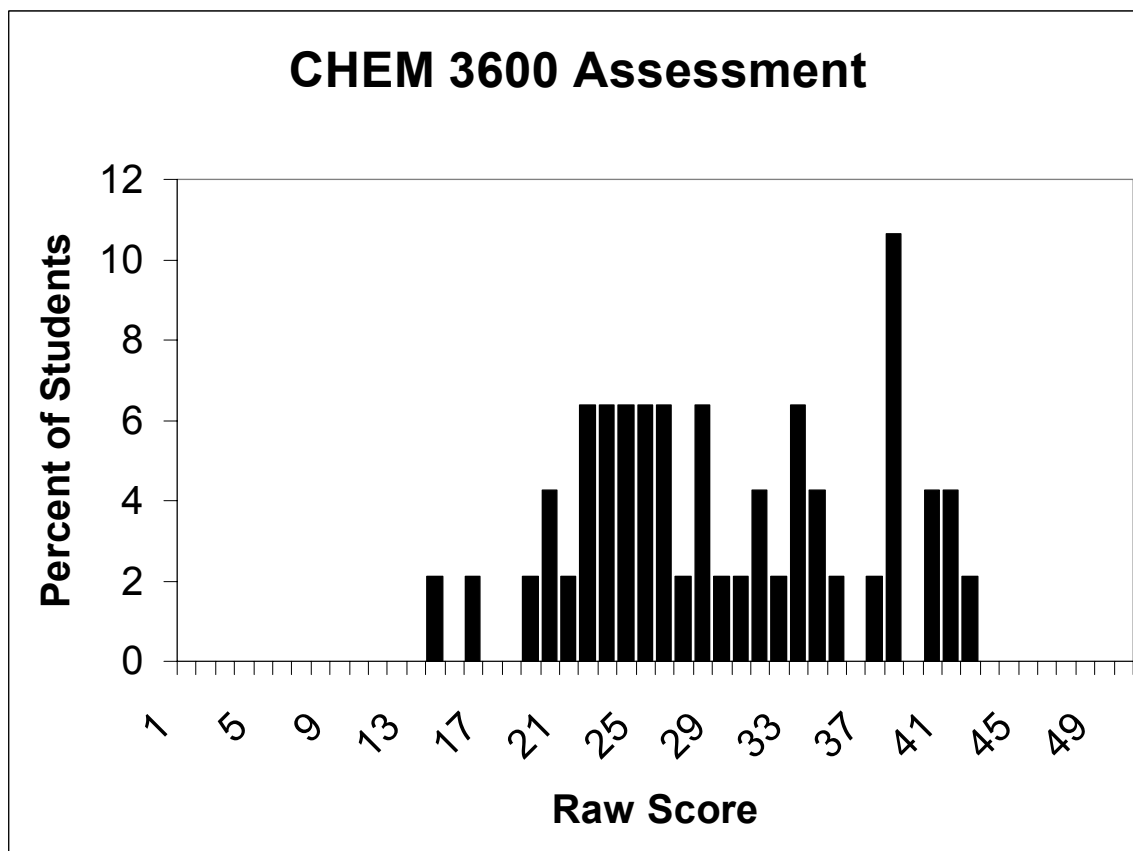


Figure 1: Histogram of CHEM 3600 performance on ACS standardized exam

Though the total class showed no significant difference with national norms, a significant difference was observed in the results of students when broken down by major. Chemistry majors scored, on average, 10 points higher than the non-majors. The following statistics were obtained, for chemistry majors (n=21): Mean=34.2, Standard Deviation=6.0, Median=35; for other majors (n=26): Mean=25.0, Standard deviation=5.4, Median=24.5. This suggests the need to better engage students who are not primarily interested in chemistry with the course content.

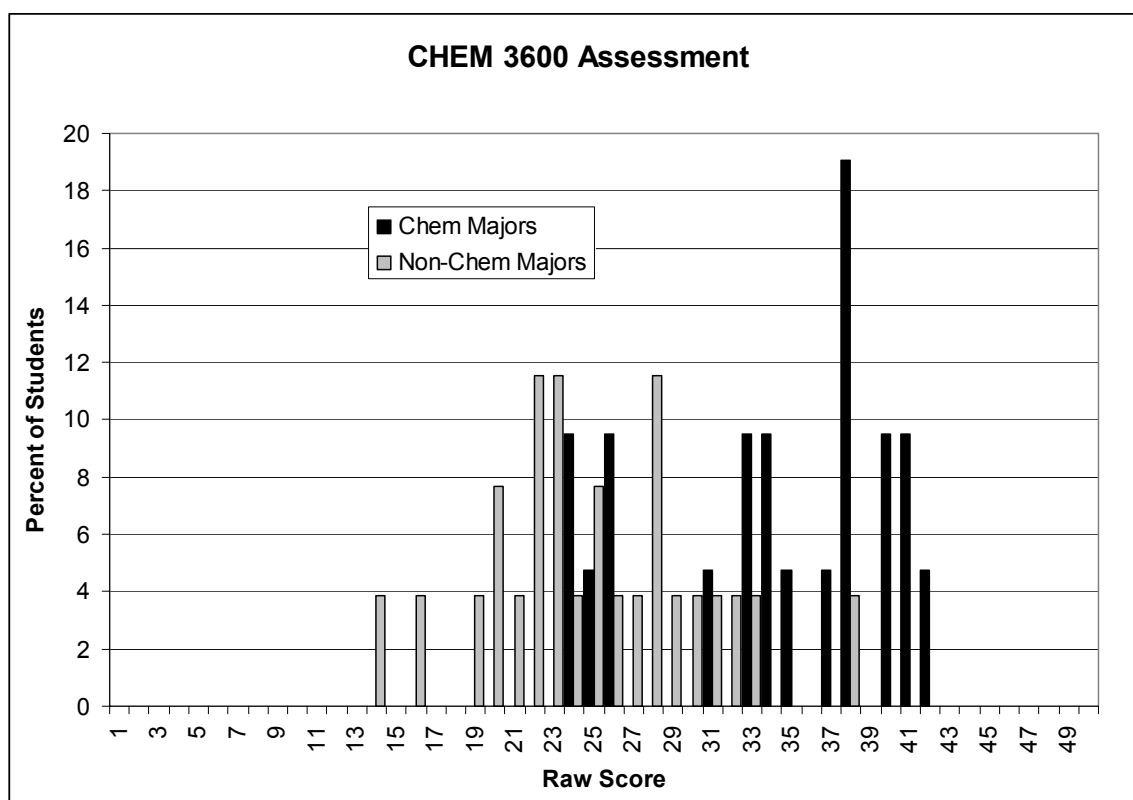


Figure 2: Histograms of student performance on standardized final by major

The ACS also provides sub-topic breakdowns from the standardized test scores to determine strengths and weaknesses of students on various topics. The ACS categorizes the 50 questions under nine topics: Data Evaluation and Error (including statistics in chemistry), Solutions and Volumetric Analysis, Gravimetry and Solubility, Acid-Base Chemistry, Coordination Chemistry, Redox Chemistry, Electrochemistry, Spectroscopy, and Separations.

USU students performed significantly higher than the national average on questions related to Data Evaluation and Error, Gravimetry and Solubility, and Acid-Base Chemistry. USU students performed significantly lower than the national average on questions related to Redox Chemistry and Spectroscopy.

CATEGORY	% Students with Correct Responses	
	USU	Nat'l
Data Evaluation and Error	68.1	58.4
Solutions and Volumetric		
Analysis	67.8	67.5
Gravimetry and Solubility	48.4	40.2
Acid-Base Chemistry	62.8	56.7
Coordination Chemistry	58.9	61.6
Redox Chemistry	46.3	57.0
Electrochemistry	55.7	59.2
Spectroscopy	56.5	64.4
Separations	51.7	52.8

Figure 3: Table showing percent of students giving correct response to questions within each sub-category for USU and national sample

Appendix

National norms provided by ACS are based on scores (703 students) from the following schools:

Belmont University (TN)
Boise State University (ID)
Cal State—San Bernardino (CA)
Central Missouri State University
Central Washington University
College of Charleston (SC)
Concordia College (MN)
Concordia University (IL)
University of Delaware
Eastern Mennonite University (PA)
Georgetown University (DC)
University of Kansas
Loyola University (IL)
Millersville University (PA)
Murray State University (KY)
University of North Carolina at Pembroke
New Mexico Institute of Mines & Technology
Ohio Northern University
Pennsylvania State University
St. Cloud State University (MN)
St. John's University (MN)
St. Louis University (MO)
Southeast Missouri State University
Southeastern Oklahoma State University
University of Southern Indiana
University of Southern Oregon
University of Southern Utah
Southwestern University (TX)
Stetson University (FL)
Texas Women's University
Utica College (NY)
West Chester University (PA)
Western Connecticut State University
University of Western Florida
University of Western Kentucky
University of Wisconsin—La Crosse
Wittenberg University (OH)
Wofford College (SC)