California State University, Fresno: Quantitative Assessment Report

California State University, Fresno has initiated campus wide assessment of the core competencies. In 2015, the University established ad hoc committees for each of the WSCUC five core competencies. The Director of Assessment, Dr. Melissa Jordine established a timeline and coordinates with the chair of the appropriate committee to carry out an assessment of one core competency every year. During the 2017-2018 academic year, the Quantitative Reasoning Core Competency was assessed. The assessment was led by the Director of Assessment, Dr. Melissa Jordine and by Dr. Paul Price and Dr. Chiang Chiaw Choo the College Assessment Coordinators for Science and Math and Engineering respectively. During the Spring 2017 semester, these representative reviewed and finalized a draft of a 25 question quantitative reasoning exam that was also reviewed by two members of the Math Department faculty and by several dozen students. The final version of the quantitative reasoning exam was approved in Fall 2017 and given to students in four of the eight Fresno State schools/colleges during the 2017-2018 AY.[[1]](#footnote-1)

Of the 25 questions, three were omitted prior to calculating results because they were control questions. One of the questions was a basic algebraic equation that all students were expected to get correct (X + 34=67). Approximately 90% of students answered the question correctly while a few students did not respond to this question and five gave an incorrect answer. Two of the questions were extremely advanced, one involving calculus, and thus these three questions were not appropriate for determining basic proficiency in quantitative reasoning. Of the 23 validated questions that were designed to evaluate basic proficiency in quantitative reasoning, all students who took the exam were expected to achieve a score of 70% or 16 out of 23 correct. All students completed the quantitative reasoning exam either during a class meeting or at the Bulldog Testing Center. The testing center verified student identifies, gave each student a one hour time limit, and enforced the rule that prohibited the use of calculators. Approximately 175 students in 4 courses took the exam during class meetings and approximately 65 students in 3 courses took the exam at the Bulldog Testing Center.

Of the 240 total students who took the exam, and were at a point near graduation, 122 (51%) demonstrated proficiency and 118 (49%) did not demonstrate proficiency. The results demonstrate that only half of Fresno State students were proficient in quantitative reasoning when they graduate. The results were disaggregated and analyzed to determine if there were any differences between specific groups. The chart below indicates that there are gaps in achievement between distinct groups including men and women. While 60% of men were deemed proficient, only 39% of women were proficient. Other differences in achievement parallel those that have previously been identified and discussed extensively in assessment literature. For example, only 38% of 1st generation college students were proficient but 68% of continuing generation students were proficient. Furthermore, only 43% of URM were proficient but 61% of white students were proficient. As expected, certain majors including science, math, and engineering had higher pass rates than Kinesiology, History, and Psychology majors. Since a calculus course is required in all the majors that had the higher pass rates and major courses also include an emphasis on calculations it is clear why 80% of these students were proficient.

Given that only 51% of students were deemed proficient, the Director of Assessment and several faculty members reviewed the quantitative reasoning exam. After a careful review of the exam questions and the results, the Director of Assessment concluded that the exam questions were not too advanced to determine basic proficiency. In reviewing the exam and results, it was noted that more than 25% of students made a calculation error on two or more questions suggesting that the use of a calculator would have made a difference in individual scores and might have resulted in a slightly higher rate of proficiency. Furthermore, the exam did focus to a great extent on calculations and not broader questions of using or interpreting mathematical day. Therefore, minor revisions will be made to the exam so that it includes more quantitative reasoning questions that involve the use of data and fewer questions that involve mathematical calculations.

It should be noted that additional support such as the increased use of supplemental instruction (peer assisted study sessions) in math and statistics courses and initiatives by the recently established College Advising Centers have not been in place long enough to have a significant impact on graduating seniors. In conjunction with the recommendations of the CSU Quantitative Reasoning Task Force and the new academic preparation guidelines in Executive Order 1100, changes to the curriculum and support structure have been extensively discussed by faculty, a GE Task Force, and by the Dean of Undergraduate Studies and Vice-Provost. The Dean of Undergraduate Studies and the Department of Math have worked together to revise the GE quantitative reasoning curriculum and these changes have been approved and will go into effect during the 2018-2019 AY.

Fresno State acknowledges that the quantitative reasoning results demonstrate a lack of student proficiency in quantitative reasoning and fully intends to disseminate the results and to take actions to address this issue. The Director of Assessment will closely monitor the current changes to the math and GE curriculum and will ask analysts in the Office of Institutional Effectiveness to prepare a dashboard focused on pass rates in revised and new math and quantitative reasoning courses. The Director of Assessment will also give a quantitative reasoning exam, during the 2019-2020 AY, to a sample of students who have taken the revised/new courses. The results of this “pilot” will be used to determine the level of student’s knowledge and skill in QR after the current changes have gone into effect. These results will determine if further should be taken before the QR is scheduled to be administered again during the 2024-2025AY.

1. Fresno State has seven schools and colleges that focus on undergraduate students and the quantitative reasoning exam was given in four out of the seven (Social Sciences, Science and Math, Health and Human Services, and Engineering) and the sample is sufficiently representative of Fresno State students. The eighth school/college is the Kremen School of Education and Human Development and all of its programs and degrees, with the exception of liberal studies, are graduate programs, which is why this college is not directly involved in the process of assessing undergraduate core competencies. [↑](#footnote-ref-1)