

Data to Findings to Action CSU Long Beach

Entry level math placement

As part of our EO 1110 redesign, we created a two-semester Essential Algebra sequence, the first semester carrying GE B4 and having co-requisite support, and both semesters together equivalent to our one-semester Precalculus Algebra. We designed this sequence to accommodate M3/M4 students, pursuing majors that require calculus or general chemistry, but we also took advantage of this new lower algebra placement to provide support to M2 students unprepared for Precalculus Algebra. We previously used various student data, including AP scores, Math SAT, and ALEKS testing, to determine if a student is prepared for Calculus, but there was not a clear set of correspondingly lower cut-offs to determine preparedness for Precalculus Algebra.

We studied data from the 591-student population of first time freshmen in Precalculus Algebra in Fall 2016, to understand how Math SAT and HS GPA correlates with success in Precalculus Algebra. We created a predictive model using logistic regression, and used it to estimate the probability of a student passing Precalculus Algebra based on his or her HS GPA and Math SAT scores. We studied the success of this model by applying it to data from the Fall 2017 Precalculus Algebra population. This statistical analysis led us to the following placement criteria.

Students are placed in Precalculus Algebra if they have

- HS GPA ≥ 3.5 and SAT ≥ 500 , or
- HS SAT ≥ 570 , or
- ALEKS score between 46 and 69 (higher scores lead to calculus placements).

We used these placement criteria to place students into Precalculus Algebra in Fall 2018 and Fall 2019, and student success in the algebra pathway improved. In Fall 2017, the pass (ABC) rate in Precalculus Algebra was 67%. After applying the new placement criteria, which removed less prepared students from the population, that pass rate rose to 74% in Fall 2018 and 78% in Fall 2019. Furthermore, the pass rate in the first semester of the new Essential Algebra course, which included those students displaced from Precalculus Algebra and those with M3/M4 classification was 77% in Fall 2018, and 79% in Fall 2019.

We also applied this strategy to Business Calculus. Our course in Business Calculus is structured to support students who have struggled in algebra, so after the EO 1110 redesign, we decided to place M3/M4 students directly into Business Calculus, adding only a 1-unit co-requisite support class to accommodate their needs. In its first semester in Fall 2018, this was not successful; only 33% of M3/M4 students who took Business Calculus in Fall 2018 passed. In response, we made the first semester of Essential Algebra a prerequisite to Business Calculus. In Fall 2019, all M3/M4 students majoring in business as well as the M2 students with lower Math SAT/HS GPA scores, mimicking the placement strategy in Precalculus Algebra discussed above, took the first semester of Essential Algebra. In Fall 2019, the pass rate for the first semester of Essential Algebra among students majoring in Business was 83%, and 81% enrolled in Business Calculus in Spring 2020. As a side note, we continued to offer the 1-unit co-requisite support class for Business Calculus, but now it operates as an optional section of Supplementary Instruction.