ACIGV2: Case Study
Calculus I at the University of Texas Rio Grande Valley
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Calculus I at the University of Texas Rio Grande Valley

Improving student success through multi-section coordination.

Background
The University of Texas Rio Grande Valley is a multi-campus, public 4-year university which is part of the University of Texas System. The undergraduate population exceeds 25,000 students, 89% of which are Hispanic, and 58% of which are first-generation college students. Beginning in 2016, a team of faculty in the School of Mathematical and Statistical Sciences revised the Calculus I and Calculus 2 courses to provide tailored instruction for students as a means to increase success rates.

Teambuilding: Improving student success through multi-section coordination
Course coordination for multi-section classes is a documented effective practice, increasing student success and providing an equitable experience for students. Coordination, especially in the early phases, is challenging in departments that have a history of independence. Such was the case with the University of Texas Rio Grande Valley which resulted from the consolidation of two universities, the University of Texas-Brownsville and the University of Texas-Pan American, campuses separated by 55 miles that merged their two mathematics departments into one.

Calculus 1 enrolls over 1,000 students annually, and is a prerequisite course for degrees in engineering, computer science, and physics. Before the course revision, Hispanic students successfully passed the course with a C or better at a rate of 57%.

The course revision, which also involved sections of Precalculus and Calculus 2, involved several stages in which instructors built a community of practice around continued improvement, creating a repository of resources for new instructors and graduate teaching assistants, coordinating assessments, and mapping the curriculum to align learning objectives with subsequent courses in the mathematics sequence. The team also agreed to use a common textbook across all sections of the course, and chose the open educational resource (OER) a free, online text, OpenStax.

In addition to the community of practice, the faculty revision team implemented four evidence-based effective instructional practices across all sections of Precalculus, Calculus 1 & 2: Collaborative problem-solving sessions guided by faculty and undergraduate Learning Assistants, tutoring and supplemental instruction sessions led by Learning Assistants, the development of an interactive Calculus webpage providing just-in-time resources for students and instructors, and implementation of Knewton Alta adaptive courseware.
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Within three years of these changes to Precalculus, Calculus 1 & 2, the Hispanic student success rate increased to 74% of enrollments in Calculus and 67% of enrollments in Precalculus.

For more information, see: Cristina Villalobos, Hyung Won Kim, Timothy J. Huber, Roger Knobel, Shaghayegh Setayesh, Lekshmi Sasidharan, Anahit Galstyan & Andras Balogh (2020) Coordinating STEM Core Courses for Student Success, PRIMUS, DOI: 10.1080/10511970.2020.1793855

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