ACIGV2: Case Study

Calculus I at the University of Texas Rio Grande Valley

The University of Texas Rio Grande Valley™

everylearner everywhere

Association of Public & Land-grant Universities

Achieving the Dream™

intentional futures

Contents

Author

Timothy Huber, Ph.D, Associate Professor and Director of the School of Mathematical and Statistical Sciences at the University of Texas, Rio Grande Valley

Citing this Resource:

To reference this work, please cite:

Huber, T. (2020, September 30) Calculus I at the University of Texas Rio Grande Valley [Case Study] Every Learner Everywhere. https://www.everylearnereverywhere.org/resources/case-study-calculus-i-at-the-university-of-texas-rio-grande-valley/

About the Supporting Organizations

Every Learner Everywhere is a network of twelve partner organizations with expertise in evaluating, implementing, scaling, and measuring the efficacy of education technologies, curriculum and course design strategies, teaching practices, and support services that personalize instruction for students in blended and online learning environments. Our mission is to help institutions use new technology to innovate teaching and learning, with the ultimate goal of improving learning outcomes for Black, Latinx, and Indigenous students, poverty-affected students, and first-generation students. Our collaborative work aims to advance equity in higher education centers on the transformation of postsecondary teaching and learning. We build capacity in colleges and universities to improve student outcomes with digital learning through direct technical assistance, timely resources and toolkits, and ongoing analysis of institution practices and market trends. For more information about Every Learner Everywhere and its collaborative approach to equitize higher education through digital learning, visit www.everylearnereverywhere.org.

Association of Public and Land-grant Universities (APLU) is a research, policy, and advocacy organization dedicated to strengthening and advancing the work of public universities in the U.S., Canada, and Mexico. With a membership of 244 public research universities, land-grant institutions, state university systems, and affiliated organizations, APLU's agenda is built on the three pillars of increasing degree completion and academic success, advancing scientific research, and expanding engagement. Annually, member campuses enroll 5 million undergraduates and 1.3 million graduate students, award 1.3 million degrees, employ 1.3 million faculty and staff, and conduct $49.2 billion in university-based research.

Achieving the Dream (ATD) leads a growing network of more than 277 community colleges committed to helping their students, particularly low-income students and students of color, achieve their goals for academic success, personal growth, and economic opportunity. ATD is making progress in closing equity gaps and accelerating student success through a unique change process that builds each college's institutional capacities in seven essential areas. ATD, along with nearly 75 experienced coaches and advisors, works closely with Network colleges in 44 states and the District of Columbia to reach more than 4 million community college students. Follow ATD on Twitter, Facebook, and LinkedIn.

Intentional Futures is a Seattle-based design and strategy studio. We work closely with clients across the public and private sectors to solve hard problems that matter and make big, ambitious ideas come to life. Our core offerings include human-centered strategy, data-driven storytelling, intentional, collective learning, and product design and prototyping. To learn more about iF or see our past work, visit intentionalfutures.com.

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.

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

Project Contact

Timothy Huber, Ph.D
Associate Professor and Director of the School of Mathematical and Statistical Sciences University of Texas, Rio Grande Valley