Introduction

High attrition rates in underrepresented minorities majoring in science, technology, engineering and math is a chronic problem that compels educators to come up with new methods to increase student success. Cal Poly Pomona will apply its “learn by doing” philosophy to four existing campus practices to address the achievement gap for at-risk STEM students:

• Create a sense of identity as a STEM major within their major and in the university as a whole during the three day residential orientation by increasing contact with STEM role models and incorporating productive persistence activities;
• Ensure that students are aware of crucial milestones by instituting a pyramid mentorship program involving faculty members and trained upper division mentors based on methods employed in Science and Engineering Support Centers, EOP, and the Psychology and Sociology Department;
• Prepare students for success in their major by redesigning gateway courses to calculus using a proven practice developed by the Physics Department to increase time for reflection through recitations sections and decrease time to degree with just-in-time instruction; and
• Reinforce students’ goal of a career in STEM by incorporating a multidisciplinary hands-on project already implemented in Engineering into the first year experience classes in both Engineering and Science and scheduling Freshman Fridays, weekly interactions with STEM alumni and industry representatives.

Each of these efforts will build on best practices already employed on campus, the close connections of Engineering and Science, and the strengths of both Student Affairs and Academic Affairs to ensure scalable and sustainable changes.

Sustainable Opportunities

• Add low cost student-success activities to Orientation
  • discipline-specific time with peers
  • productive persistence exercises
• Redesign Pre-Calculus and Calculus to increase success in STEM and to decrease time to degree
  • Fewer repeats will open seats to more students
  • Shorten the time lag for students who don’t take AP Calculus
• Increase Relevance in the First Year Experience
  • FYE Lab start in theory and end in practice
  • Regular meetings with alumni and industry representatives

Challenges

• Some activities, such as peer mentoring, may not be scalable or affordable.
• Self-selection may mean program misses those who could most benefit
• Student Success Programs need to avoid stepping on each other’s toes
• Concern for faculty leadership after funding ends

Team Members

• Principal Investigator: Claudia Pinter-Lucke, Associate Provost, Academic Affairs
• Co-Director: Cynthia Anderson Sanchez, Lecturer in Biological Sciences
• Co-Director: Zekeriya Aliyazicioglu, Associate Chair in Electrical and Computer Engineering
• Evaluators:
  • Jill Nemiro, Professor in Psychology and Sociology
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• Team Members
  • Berit Givens, Professor in Mathematics and Statistics
  • Arlo Caine, Assistant Professor in Mathematics and Statistics
  • Cecilia Santiago-González, Director of Enrollment & One-Stop Services
  • Leticia Guzman Scott, Executive Director of Student Support and Equity Programs

Participants

We will be recruiting first generation, socioeconomically challenged, and underrepresented students in Science and Engineering prepared for college level mathematics. We will cooperate with other Student Success Efforts on campus to seek students who have not been invited to participate in their summer/first year programs.

In the second year, will will recruit a wider range of STEM students for the summer program, the peer mentoring, and the Freshman Fridays. The redesigned courses will be made available to students outside our targeted group.

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