Project Abstract: Bridging the Gap: Enhancing AIMS^2 for Student Success

This collaborative project is led by the College of Engineering and Computer Science (CECS) at California State University, Northridge (CSUN), in partnership with five community colleges: Glendale Community College (GCC), College of the Canyons (COC), Pierce College, Moorpark College, and LA Mission College (LAMC). It builds on the highly successful and nationally recognized USDE supported AIMS^2 program in the college that has served approximately 200 students during the past five years. However, challenges remain in improving overall graduation rates for all Hispanic and low income students given their increasing enrollments across the college's programs. Our proposed community college partners are among the top ten institutions that transferred Hispanic students to the college and represented over 50% of the transfer students in fall 2014. With the new grant, we will increase the numbers of students served to over 500, bridge the achievement gaps, improve transfer success, and increase overall graduation rates for all Hispanic and low-income students in CECS and across CSUN's STEM programs.

Across the partner institutions, we expect to improve student retention and performance in math courses beginning with the freshman calculus course. The team expects to improve the graduation rates in CECS for all students and eliminate the gap between URM's and others. Students enrolled in the AIMS^2 cohorts will continue to have access to special mentoring and advisement by faculty, tutoring and peer mentoring, social activities, field trips and opportunities to take part in undergraduate research projects. The proposed quasi-experimental evaluation design is expected to produce evidence of effectiveness that will document changes in students who participate in the project.[1] It features a pre-/post-test survey research procedure with matched samples (intervention and comparison groups) that will include baseline equivalence on background characteristics (p.10)[2]. The study will use two widely used survey instruments and institutional data to test the outcome measures and will be administered at project entry and exit for each cohort across sites. The project's performance and outcome measures direct the evaluation study, which will demonstrate favorable gains in the intervention group—consistent with the procedures and findings of two studies reviewed by the What Works Clearinghouse[3][4]

Against the backdrop of the literature on Latino/a and low-income students[5], we have developed project activities to support measurable outcomes, as seen in our logic model, which will be assessed by a rigorous approach that includes a mixed-methods design with survey, institutional, and semi-structured personal interview data. The proposed project has the potential to significantly improve graduation rates and close the achievement gaps for Hispanic and low-income students, expand undergraduate research projects to mentor students, and enhance faculty collaboration between two year and four year institutions to improve student success.

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[1] Wiersma, W., & Jurs, S. G. (2009). Research Methods in Education: An Introduction. Boston: Pearson.
[2] U.S. Department of Education, Institute of Education Sciences, What Works Clearinghouse. (2014). What Works Clearinghouse Procedures and Standards Handbook.
[3] U.S. Department of Education, Institute of Education Sciences, What Works Clearinghouse. (2013). *WWC review of the report: The impact of dual enrollment on college degree attainment: Do low-SES students benefit?* Retrieved from http://whatworks.ed.gov
[4] U.S. Department of Education, Institute of Education Sciences, What Works Clearinghouse. (2014). *WWC review of the report: Are tenure track professors better teachers*. Retrieved from http://whatworks.ed.gov
[5] Cole, D. (2010). The effects of student-faculty interactions on minority students' college grades: differences between aggregated and disaggregated data. Journal of the Professoriate, 3(2), 137-160.

LOGIC MODEL FOR BRIDGING THE GAP: ENHANCING AIMS^2 FOR STUDENT SUCCESS

PROBLEMS

Current Conditions
- Students challenged to balance commitments
- Student difficulties with time management
- Low math prerequisite course completion rates
- Pre-transfer student campus and department disconnections
- Transfer students challenged to navigate, negotiate campus services/processes
- Students lack connections to successful role models in business and industry

Current Practices
- Minimal student contact with faculty outside of class
- Limited opportunities to develop meaningful campus relationships
- Undergraduate research participation and academic support restricted to small group of students
- Few student career-related connections

RESOURCES/ INPUT

Financial Support
- Student incentives to participate in research
- Faculty and staff support for project activities

Intellectual Resources
- PI/Co-PI training and disciplinary backgrounds
- Faculty mentor expertise
- Student backgrounds
- Tech expert training
- Advisory Board member affiliations

Physical Resources
- Print/digital books
- Interactive material
- Social media
- iPads/tablets with engineering apps
- Student academic and social space

Business Partners
- Advisory board members
- Regional employers

ACTIVITIES

Faculty Mentoring
- Faculty mentoring students
- Faculty-led student activities/processes
- Faculty-student professional events

Peer Mentoring & Tutoring
- Pre- and post-transfer peer-peer mentoring/ tutoring
- Transfer-ready and senior-standing student mentoring

Academic Support
- Programming fundamental crash course
- Calculus interactive materials/course section
- Academic tech workshops
- English/math workshops
- Dedicated library books
- Online video tutorials

Student Research
- Faculty summer and academic term research

Career Preparation
- Student career workshops and professional associations
- Summer job internships

OUTPUTS

Student-Faculty Mentoring Relationships
- Increased contact between faculty and students
- Weekly meetings with faculty mentors who guide/support students
- Faculty communication via email, LMS, etc.
- Student-faculty interaction in professional settings

Transfer Student Support
- Peer mentors associated with each faculty mentor
- Peer tutors assigned to each site/department
- Frequent/quality social interaction at events
- Support for calculus prerequisite courses
- Transfer video resources

Student Design Projects
- Student development of Senior Design Projects and engineering projects across sites

Career & Pre-Professional Experiences
- Career workshops
- Professional association events/activities

OUTCOMES: SHORT-TERM

Student Attitudinal & Behavioral Changes
- Enrollment, next-year retention, gateway course success, and transfer
- Development of academic self-confidence, self-efficacy, and validation
- Development of course success skills

Transfer Student Socialization & Transfer Shock Mitigation
- Enrollment, gateway course success, on-track completion, and actual completion
- Skills and knowledge to successfully navigate transfer process
- Calculus course success

Student Research Skills
- Development of research skills and attitudes about research across fields

Career Preparation Skills
- Development of skills and professional contacts to apply for and successfully secure entry-level employment

IMPACTS/OUTCOMES: LONG-TERM

Student Transfer, Completion, & Post-Graduation Success
- Development of long-lasting, meaningful relationships with faculty and students to support successful student outcomes and graduate school/early career needs
- Internalization of a suite of student success skills—cognitive and non-cognitive
- Development of long-term support/ value for engineering and computer science education and research

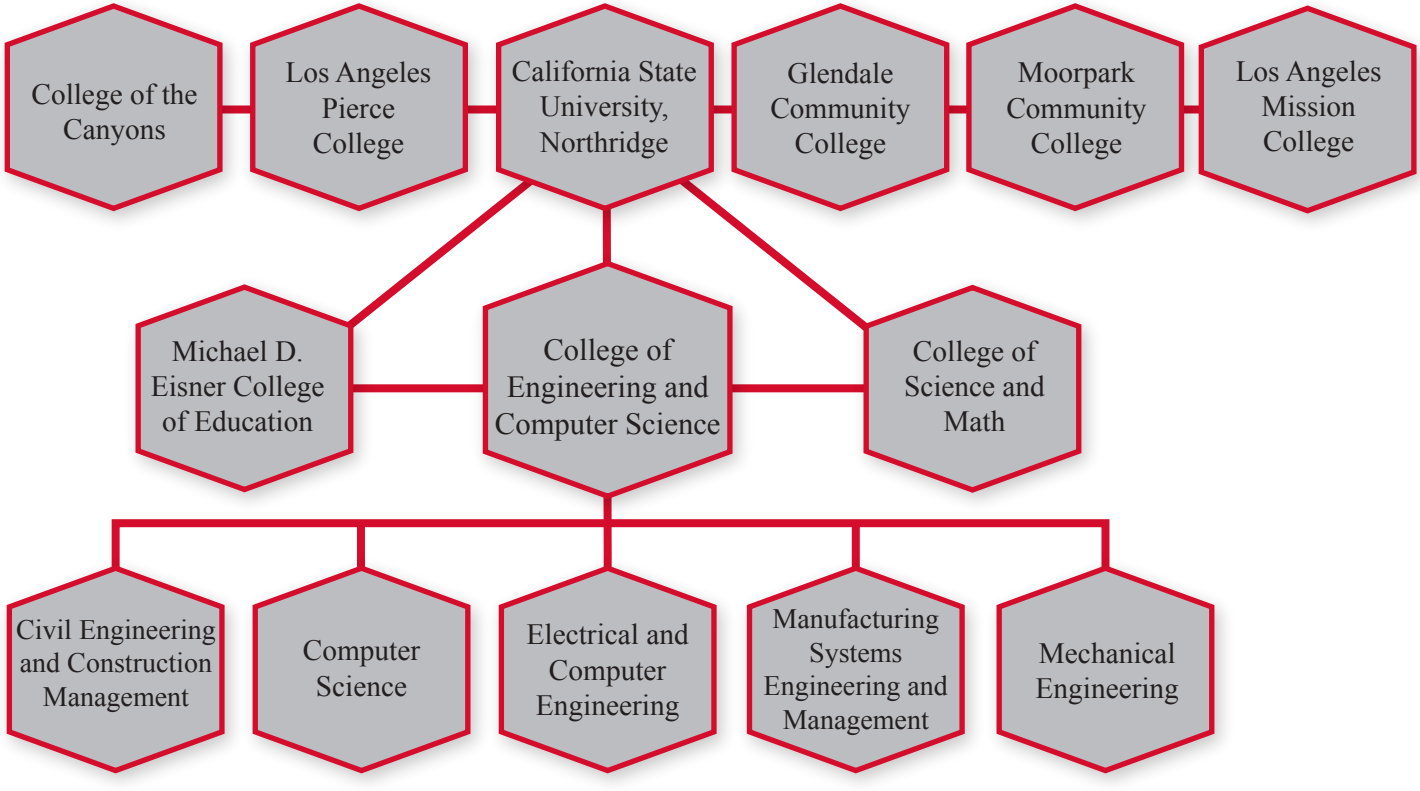
Career Placement & Development
- Successful placement and promotion in careers in local and regional engineering and computer science fields
- Network of alumni who serve as role models for the next generation of students preparing for careers

Current Assumptions:
1. Current AIMS^2 project model development
2. Partnership engagement and institutional interest and support

Context (External Factors):
1. Disciplinary training/research orientation of CSUN and community college faculty
2. Institutional changes across collaborative partnership sites and CSU-HSI STEM network
3. Market specialization of local/regional businesses/nonprofit organizations

Assessment Data
1. Pre- and post-test survey data of engineering majors
2. Institutional data on enrollment, achievement, transfer, and completion
3. Interview data on student-faculty and peer interaction

Assessment Data
1. Pre- and post-test survey data of engineering majors
2. Pre- and post-test survey data on undergraduate research participation
3. Interview data on career placement/experiences



Organization – Bridging the Gap: Enhancing AIMS² for Student Success