

Preparing Underserved Students for High-Demand Occupations

Prepared for Foothill-De Anza
Community College District

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In the following report, Hanover Research examines best practices and peer programs for preparing underserved students for high-demand (STEM and health) occupations, with a focus on the California community college system.

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EXECUTIVE SUMMARY AND KEY FINDINGS

INTRODUCTION

In this report, Hanover provides an overview for Foothill-De Anza Community College District (FHDA) of best practices and peer programs that help to prepare and encourage historically underserved students to complete degrees in high-demand occupations. We focus primarily on STEM and healthcare-related fields in the California community college system.

As noted in our previous report for FHDA, STEM and healthcare-related professions are projected to have strong growth over the coming decades, while Silicon Valley's current slight Latino majority is projected to increase considerably by 2060. Healthcare professions such as nursing (registered nurses, licensed practical and vocational nurses, nursing aides) and ancillary healthcare roles (EMTs, diagnostic medical sonographers, respiratory therapists) project strong growth, while STEM fields (software development, electrical technicians, aerospace technicians) are also projected to increase rapidly in coming years.

For this report, we reviewed programs at FHDA's peer community colleges (in **Section I**) as well as numerous literature reviews and scholarly studies from the California Community Colleges Chancellor's Office (CCCCO) and other entities to condense the most relevant best practices (in **Section II**) as determined by scholars and researchers in the field.

KEY FINDINGS

FUNDING

In general, STEM-related or healthcare-related programs for underserved students at California community colleges are primarily funded by federal and foundation grants. Community colleges in California have received relevant federal grants from:

- Dept. of Education—Title III and Title V HSI/STEM
- Dept. of Education—TRIO (Upward Bound, Student Support Services)
- Dept. of Education—Investing in Innovation Fund (i3)
- Dept. of Education—Minority Science and Engineering Investment Program (MSEIP)
- Dept. of Education—Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP)
- Dept. of Health and Human Services, Health Resources and Services Administration—Nursing Workforce Development (NWD)
- Dept. of Labor, Employment & Training Administration—Workforce Investment Act
- National Institutes of Health—Bridges to Baccalaureate (BTB)
- National Science Foundation—Research Experiences for Undergraduates

- National Science Foundation—Improving Undergraduate STEM Education (IUSE)
- California state government and University of California (UC) System—Mathematics, Engineering, Science Achievement (MESA)
- PUENTE (De Anza College is already participating in this program)

Foundations that have consistently supported California peer programs include:

- Robert Wood Johnson Foundation & W. K. Kellogg Foundation (“Health Professions Partnership Initiative”)
- William and Flora Hewlett Foundation
- James Irvine Foundation
- Walter S. Johnson Foundation
- Lumina Foundation
- David and Lucile Packard Foundation
- Johnson & Johnson Corporation (“Bridge to Employment Initiative”)

There is relatively little federal funding for California community college nursing program support (apart from HRSA-NWD), and there are not any relevant examples of the nursing or healthcare profession equivalent of the “STEM Center” model found at various colleges in California.

PROGRAM FEATURES

Peer program features typically include most of the following:

- Tutoring
- Seminars/conferences
- Guest speakers
- Workshops
- A student study center
- Career counseling
- Internship opportunities
- Laboratory/workplace field trips
- Faculty mentoring/counseling
- Targeted financial aid and scholarship support
- K-12/community outreach
- Networking opportunities
- Partnerships with other community colleges and/or UC & CSU schools
- MESA program support

BEST PRACTICES

Scholarly recommendations for best practices regarding the recruitment and retention of underserved students include:

- Undertaking targeted outreach to underserved groups through representatives of the target group (if possible), informing families about postsecondary opportunities and in-demand fields. Such outreach should include community outreach at churches and similar venues—various scholars recommend creating and leveraging partnerships with community-based organizations for this purpose.
- Creating a campus-wide culture of inclusion and outreach to underrepresented students, including focused ESL support and professional development for key staff (including administrators and faculty) who should be informed of the unique challenges faced by underserved students.
- Providing targeted mentoring, structured guidance, counseling, and testing for skills and competencies to help students navigate the higher education system.

Notably, California currently operates a K-12 pipeline initiative (HASPI) as well as a statewide high school 'bridge' program (ConnectEd) that helps underserved students apply to community colleges. Similarly, the UC system has an Early Academic Outreach program for high school students.

SECTION I: PEER PROGRAM PROFILES

In this section, Hanover profiles model programs at community colleges in California that serve to recruit and assist underserved students in STEM and related fields.

PALOMAR COLLEGE

Palomar College is the recent recipient of a Title V (HSI) STEM grant from the Dept. of Education, intended to assist the College in increasing the number of STEM degrees awarded to low-income and underrepresented students. More specifically, the STEM grant is a collaborative effort between Palomar College and CSU San Marcos to strengthen the STEM Transfer Pathway by:¹

- Increasing student participation in STEM programs by providing outreach, counseling, and guidance;
- Improving student persistence by enhancing their engagement in the STEM learning process;
- Strengthening STEM programs, curriculum, and equipment;
- Opening a STEM Center to provide a social and academic learning environment; and
- Creating a seamless transfer process between Palomar College and CSUSM.

Services provided include:²

- Tutoring;
- Supplemental Instruction (SI);
- STEM Seminar Series;
- Internship announcements and placement assistance;
- Visits to academic and scientific facilities;
- Opportunities to work with Faculty Mentors;
- Student support workshops;
- Access to financial aid and scholarship information workshops;
- Academic Advising offered by Palomar College Counselors and student support services provided by a CSUSM Advisor; and
- Palomar-CSUSM Student Peer Mentoring.

Palomar also operates a STEM Center, spread across two classrooms, which provides:³

- Supplemental Instruction workspace;
- Independent study space;
- Limited group workspace;
- STEM academic planning and student counseling for STEM Scholars;

¹ Palomar College, "STEM." <http://www2.palomar.edu/stem/>

² Palomar College, "STEM Initiatives." <http://www2.palomar.edu/stem/Initiatives.htm>

³ Palomar College, "Success Begins at the STEM Center." <http://www2.palomar.edu/stem/center.htm>

- Computer use and pay-per-print;
- Laptop checkout;
- Use of STEM reference materials (textbooks, anatomical models, rock samples); and
- Free walk-in tutoring

Palomar also provides a helpful list of internships, along with a number of speakers, events, and career workshops.^{4,5} One particularly noteworthy feature of Palomar's STEM program is its peer mentoring initiative. This is a yearlong program where CSUSM students mentor Palomar STEM Scholars to enhance academic success, transfer, and entry into STEM careers and research programs. Palomar STEM Scholars are matched with CSUSM students based on academic and personal interest. This peer mentoring program gives students:⁶

- Access to a support system during critical stages of academic and career development;
- An insider's perspective on navigating CSUSM;
- Direct access to powerful resources within the student's major;
- Greater knowledge of career and academic success factors at CSUSM; and
- The foundation of a lasting professional network and personal relationships among students and faculty at CSUSM.

Palomar has also received a Bridges to Baccalaureate grant from NIH which helps to support underrepresented community college students interested in science careers, so they may complete their lower division requirements and transfer to a four-year university. In addition, students accepted into the program are introduced to biomedical research in the hope that they will pursue research careers.⁷

GLENDALE COMMUNITY COLLEGE AND COLLEGE OF THE CANYONS (AIM)

Glendale Community College and College of the Canyons (in collaboration with CSU Northridge) were recently awarded a five-year grant, the "CSU Northridge Engineering and Computer Science HSI-STEM Initiative," funded in 2011 through the Dept. of Education's Title III program. This initiative, entitled "Aspire, Initiate, & Master" (AIM), provides the opportunity for engineering and computer science majors with faculty mentoring and student support services in an effort to facilitate the transfer process to CSUN.⁸ Participants receive:

- Free tutoring;
- GCC faculty mentoring;
- STEM transfer counseling;
- Research opportunities;

⁴ Palomar College, "Internship Opportunities." <http://www2.palomar.edu/stem/Internships.htm>

⁵ Palomar College, "New & Useful Links." <http://www2.palomar.edu/stem/news.htm>

⁶ Palomar College, "Peer Mentoring Program." <http://www2.palomar.edu/stem/peer.htm>

⁷ Palomar College, "Bridges Scholar Program." <http://www2.palomar.edu/stem/Bridges.htm>

⁸ Glendale Community College, "About AIM." <http://www.glendale.edu/index.aspx?page=5225>

- Internships;
- Annual grants;
- Field visits; and
- Networking opportunities.

The primary objectives of AIM is to increase the number of Hispanic and low-income students who successfully transfer from GCC to CSUN in STEM fields. Those who plan to major in STEM related fields at GCC are eligible and must be an individual who has faced or currently faces social, cultural, educational or economic barriers to careers in STEM.⁹ Students who satisfy the requirements are awarded an annual stipend of \$1,200 per student (limited to two years maximum at GCC). Students have the opportunity to participate in internships, high school outreach, and research projects while at CSUN.¹⁰

SANTA ANA COLLEGE AND FULLERTON COLLEGE (ENGAGE)

The Encouraging New Graduates and Gaining Expertise in Science, Technology, Engineering and Math (ENGAGE in STEM) initiative is a collaboration between three institutions (Santa Ana College, Fullerton College, and CSU Fullerton) dedicated towards increasing awareness, retention, and success of students in STEM fields and majors. The primary goal of ENGAGE is to increase the number of STEM degrees awarded to Fullerton College and Santa Ana College transfer students to CSU Fullerton. ENGAGE aims to:¹¹

- Establish model transfer and articulation agreements between Fullerton College and CSU Fullerton leading to an increase of students earning bachelor degrees in earth science and engineering;
- Increase the number of students entering teacher preparation programs in order to become secondary math and science teachers and increase the ability and knowledge of prospective elementary school teachers in math and science areas; and
- Offer a variety of services including workshops, internships, fieldwork experience, conferences, financial assistance, and research opportunities that are available to students pursuing a STEM major.

At Fullerton College in particular, ENGAGE includes a robust advising/mentoring program, many STEM-related events each semester, and a first-year experience program. Santa Ana College has more information regarding ENGAGE-related campus programs, which include:¹²

⁹ Ibid.

¹⁰ CSU Northridge, "AIMS." <http://www.ecs.csun.edu/aims2/>

¹¹ Fullerton College, "ENGAGE in STEM." <http://engageinstemfc.com/welcome/#more-3889>

¹² Santa Ana College, "SAC Campus Programs." <http://engageinstemsac.com/sac-campus-programs/#sthash.RELZUy1.dpuf>

- **Center for Teacher Education**—The Center for Teacher Education (CFTE) is a resource center which offers information, academic advisement and support for students interested in pursuing a career in teaching with an emphasis in preparing students for employment in local public elementary and secondary schools;
- **MESA**—the MESA Program is an academic program that supports educationally disadvantaged community college students to excel in math, computer science, engineering, and science so they can transfer to four-year institutions as majors in these fields;
- **STEM Teaching Scholars Program**—Through the STEM Teaching Scholars Program students participate in a paid fieldwork experience in which they tutor for 60 hours a semester in a K-14 classroom where students also receive mentorship by an elementary, secondary, or college math/science teacher; and
- **Bridge 2 Engineering Program**—B2E is a cohort-based learning community that focuses on increasing the participation of underrepresented minorities, women and veterans in the field of engineering.

Santa Ana’s ENGAGE program also has extensive partnerships and outreach with area high schools to raise awareness of STEM majors and careers. Programs include:¹³

- **Early Decision**—The Early Decision Program encourages high school seniors to consider attending SAC and the benefits of a community college education;
- **iAdelante! Program**—To assist in elevating the academic achievement of recent graduates from local area high schools, iAdelante! students at SAC receive a promise of admission to either CSU Fullerton or UC Irvine, upon completion of transfer requirements;
- **Bio Tech Summer Program**—Current junior high and high school students have the opportunity to participate in the ‘Crime Scene Investigation (CSI): Summer Camp’ held on the SAC campus; and
- **SAC Academic Talent Search Summer Science Program**—The goal of this program is to prepare high school students for eligibility to the post-secondary institution of their choice upon graduation.

SAN BERNARDINO VALLEY COLLEGE

San Bernardino Valley College was recently awarded an HSI STEM PASS GO Grant by the U.S. Department of Education to provide support mechanisms that are intended to enhance success, completion, graduation and transfer rates of Hispanic students, low-income, and underrepresented students in STEM. An important component of the PASS GO program is a partnership with CSU San Bernardino (CSUSB). Any student that transfers from SBVC to CSUSB and is a declared STEM major is automatically a part of the program.¹⁴ Benefits include:¹⁵

¹³ Santa Ana College, “Jr. High/High School Outreach.” <http://engageinstemsac.com/jr-highhigh-school-outreach/>

¹⁴ San Bernardino Valley College, “HSI STEM PASS GO Grant.” <http://www.valleycollege.edu/student-services/tutoring-academic-support/stem/hsi-stem-pass-go-grant>

¹⁵ CSU San Bernardino, “Becoming Part of PASS GO.” <http://passgo.csusb.edu/aboutUs/becomingPartPass.html>

- Enrichment activities, workshops, and career exploration in STEM fields;
- Personalized counseling to help students achieve personal, career, and academic goals;
- One-on-one career coaching to help students secure and successfully complete an internship in the STEM field;
- Developing soft skills such as resume writing, cover letter writing, and interviewing skills to help build professional identity and obtain career objectives;
- Build a strong network with cohort peers with similar goals, interests, and aspirations; and
- Networking opportunities through field trips, career fairs, professional organizations, and conference presentations.

Other support includes career counseling, service learning internships, and career workshops.¹⁶

CAÑADA COLLEGE

Cañada College presents an interesting example of a community college that was awarded numerous federal/state grants to increase recruitment, retention, and success in STEM fields, particularly for underserved Latino students, but (as an article puts it) “found that the best way to capture gains from limited-term federal grants was to found a permanent STEM center.” As the project director put it, “We decided to design a structure on our campus that would be an umbrella for all the different programs and funding sources that come and go that create longevity in support services.”¹⁷

The College’s STEM Center was founded in 2011 and serves as a way to “consolidate various programs and STEM-related offerings under one roof.” Building on previous grants through MESA, the Dept. of Education, and the NSF, the college was awarded another \$6 million grant from the Department of Education in 2011 for the STEM Center itself. The Center was able to incorporate MESA, Math and Physics Jam programs, tutoring, and a Summer Engineering Institute.¹⁸

A total of 38 STEM Center students were awarded internships in 2013 through a variety of institutions, including NASA, Princeton University, and Stanford University. Cañada College has seen an overall increase of 43 percent increase in STEM enrollment and 183 percent jump in math enrollment, thanks to the STEM Center.

Cañada College’s STEM Center website lists more details regarding detailed tutoring schedules, a speaker schedule, special STEM scholarships, various internships, student clubs, faculty development programs.¹⁹ Specific grant-funded programs operated under the purview of the STEM Center are as follows:

¹⁶ CSU San Bernardino, “Services.” <http://passgo.csusb.edu/services/index.html>

¹⁷ Maria Miranda, “Cañada College’s STEM Center a One-Stop Shop for Support” (December 23, 2013). <http://diverseeducation.com/article/59668/>

¹⁸ Ibid.

¹⁹ Cañada College, “STEM Center,” <https://canadacollege.edu/stemcenter/tutoringschedules.php>

Figure 1.1 Cañada College STEM Center Programs

CALSTEP	The California Alliance for the Long-term Strengthening of Transfer Engineering Programs (CALSTEP) program is a collaboration between Cañada College, San Francisco State University School of Engineering, and Los Angeles Pierce College awarded through ED's HSI-STEM initiative. The CALSTEP project promotes an understanding and appreciation of STEM careers through outreach activities for middle school, high school, and community college students.
MESA	Mathematics, Engineering, Science Achievement (MESA) is an academic preparation program that assists California's students to succeed in math and science and attain four-year degrees in math and science fields. MESA serves educationally disadvantaged students and, to the extent possible by law, emphasizes participation by under-represented students. The MESA California Community College Program (MESA CCCP) serves community college students and assists them in successfully transferring to four-year institutions as math or science majors.
MSETS	Cañada College's Mathematics, Science and Engineering Transfer Scholarships (M-SETS) program provides 140 scholarship awards to academically talented, financially needy students working to transfer to a 4-year university to complete an undergraduate degree in an engineering, math or science major. M-SETS awards will be offered for up to three years of full-time academic study at Cañada College and in the first semester that a student transfers to a 4-year university. The scholarship program will provide a unique opportunity for low-income students to focus full-time on their studies and fully benefit from the MESA program.
NASA COMETS	The "Creating Opportunities for Minorities in Engineering, Technology, and Science" (COMETS) program is a collaboration between Cañada College's Engineering Department and San Francisco State University School of Engineering. The project is sponsored by the National Aeronautics and Space Administration (NASA) Office of Education. COMETS improves student engagement in STEM, offers a research internship program, and improves academic success.
VEAP	The Bay Bridge to Engineering for Veterans Program is supported by a grant through the Workforce Investment Act: Veterans' Employment-Related Assistance Program (VEAP), and developed through a partnership between Cañada College, San Francisco State University, the San Mateo County Workforce Investment Board, and Growth Sector. The Veterans Employment Assistance Grant (VEAP) provides a unique opportunity for veterans and their qualifying spouses to enter a career in Engineering. Selected candidates will enter a nine month Pre-Engineering program at Cañada College receiving a CAD or Surveying Certificate, the opportunity to compete for paid internships, and assistance in transferring to one of the four-year Engineering Programs at SFSU and CSU. Additionally, candidates will have access to career counseling, mental health services, job development, and supplies necessary to begin a new career in engineering.
SETI	The Summer Engineering Teaching Institute (SETI) assists California community college engineering faculty in developing a Tablet-PC-based interactive model of engineering instruction, increasing their involvement in developing and implementing online courses using CCC Confer—a videoconferencing platform that is available free of charge to all faculty and staff of the California Community College system. In the first year of the program, 30 California engineering faculty participated; 10 from Southern California, and 20 from Northern California.
SOLES	The SOLES project is supported by a grant from the U.S. Department of Education through the Minority Science and Engineering Improvement Program (MSEIP). SOLES aims to maximize the likelihood of success among underrepresented and educationally disadvantaged students interested in pursuing careers in STEM through a combination of programs and services proven to increase recruitment, retention and success.

Source: Descriptions adapted from Cañada College²⁰

²⁰ Cañada College, "Grants and Funding." <https://canadacollege.edu/stemcenter/grants-funding.php>

CABRILLO COLLEGE

Cabrillo College has an interesting STEM-focused initiative, the Science, Technology and Energy: Expanding Potential (STEEP) program, which is a multi-component program designed to enhance and support the participation of its STEM students. STEEP is particularly relevant for FHDA insofar as this program is meant to meet the workforce needs in the greater Silicon Valley and Monterey Bay area.²¹ The program is described further by the College:²²

STEEP attracts and retains STEM students with a summer Precalculus Preparedness Seminar, a summer Energy Laboratory Academy as a preparation for a later internship, a Sustainability Team, placement in undergraduate research and/or industry internships summer, and counseling, mentoring and tutoring support through an existing Math, Engineering, Science Achievement (MESA) center. A capstone activity of the Energy Laboratory academy is a community service project involving photovoltaics. Other efforts aimed at increasing retention within STEM majors include provision of instruction to strengthen skill sets important in gateway courses in math and laboratory science.

STEEP is a response to a gap analysis created as a result fifteen years of experience working with and observing underrepresented students in Cabrillo's MESA Center, where staff identified three critical factors that inhibit students' decisions to pursue STEM majors:²³

- **Limited Mathematics Skills**—undeveloped K-12 mathematics skills, fear of the subject, lack of success in past classes, limited understanding of the demands of college work, or a lack of study skills;
- **Limited Laboratory Experience**—little or no high quality laboratory experience in K-12, lack of experience building things during childhood and adolescence, lack of understanding about how mechanical things work, and a lack of experience measuring and hypothesizing;
- **Years of Education Necessary to Achieve STEM majors**—more motivation is needed for students to envision their persistence over the many years of college study required to complete a STEM degree.

²¹ Cabrillo College, "STEEP." <http://www.cabrillo.edu/services/mesa/STEEP/about.html>

²² Ibid.

²³ Ibid.

MESA (CALIFORNIA-WIDE)

Started in 1970, the MESA program was founded at Oakland Technical High School with 25 students and has since expanded into a statewide program. The goal of MESA is to:²⁴

Develop academic and leadership skills, raise educational expectations, and instill confidence in California's students historically underrepresented in engineering, physical science, or other math-based fields, in order to increase the number of African American, Latino American and American Indian graduates from a four-year university.

Mentioned in a number of profiles above, MESA is funded by state appropriations along with corporate sponsorships.²⁵ As of the 2011-12 academic year, MESA's outreach statistics include:²⁶

Figure 1.2: MESA Outreach (2011-12)

CATEGORY	NUMBER
STUDENTS SERVED BY MESA	
Pre-college	20,299
Community college	4,707
University level	3,186
Total	28,192
COLLABORATIONS WITH EDUCATIONAL INSTITUTIONS	
University of California campuses	5
California State University campuses	10
California Community College campuses	36
Independent four-year campuses	3
Community sites	3
Senior high schools	164
Middle and junior high schools	174
Elementary schools	55

Source: MESA²⁷

A full list of community college partners is provided on the MESA website.²⁸ Notably, of the MESA community college students who transferred to four-year institutions, 97 percent entered these colleges and universities as math or science majors. Of the California MESA community college students who transferred to four-year institutions:²⁹

²⁴ MESA, "Timeline." <http://mesa.ucop.edu/about/history.html>

²⁵ Ibid.

²⁶ Ibid.

²⁷ MESA, "MESA Data and Results." <http://mesa.ucop.edu/about/outcomes.html>

²⁸ MESA, "Education Partners." <http://mesa.ucop.edu/about/edupartners.html>

²⁹ MESA, "MESA Data and Results." <http://mesa.ucop.edu/about/outcomes.html>

- 49 percent transferred to the UC system;
- 44 percent transferred to the CSU system; and
- 7 percent transferred to independent California universities and colleges, out-of-state universities and colleges, and others.

MESA's schools program assists students at middle and senior high schools (and some elementary schools) to "excel in math and science and become competitively eligible for academically rigorous colleges and universities," while MESA for middle schools and high schools includes "individual academic plans, study skills training, and parent leadership development."³⁰

MESA's community college program (MCCP) provides STEM academic development for educationally disadvantaged students, particularly for low-performing high schools. The MCCP is a partnership between MESA and the CCCCO. Main components of the MCCP include:³¹

- **Academic excellence workshops**—Students are scheduled in the same core math and science classes and taught how to successfully master complex technical ideas and principles through a collaborative approach.
- **Orientation course**—New students learn skills to excel as math, science and engineering majors.
- **Academic advising/counseling**—Students receive individualized academic guidance and develop multi-year plans so they can take courses in the most effective sequence and transfer in a timely manner.
- **Student study center**—This dedicated multipurpose space is the hub for study, workshops, special activities and information sharing. It is a key element in building a close learning community.
- **Assistance in the transfer process**—MESA provides counseling, workshops and visits to four-year universities.
- **Career advising**—Students are exposed to various math, engineering and science career options through industry mentors, field trips, job shadowing, career fairs and internship opportunities.
- **Links with student and professional organizations**—These resources provide mentors, guest speakers and tours of companies.
- **Professional development**—Through workshops and mock job fairs, students learn about corporate culture, improve their resume writing and interviewing skills and are offered opportunities for part-time, full-time and summer employment related to their majors.
- **Industry Advisory Board**—Corporate representatives, including MESA alumni, participate on advisory boards at centers to provide strategic planning assistance, scholarships, summer internships, field trips and other resources. The board is a valuable connection between the students and companies that recognize MESA's success in helping to develop the technical professionals they need.

³⁰ MESA, "MSP." <http://mesa.ucop.edu/programs/schoolprogram.html>

³¹ MESA, "MCCP." <http://mesa.ucop.edu/programs/mesaccpc.html>

Within the MCCP program, MESA operates an Engineering Program (MEP), which “supports educationally disadvantaged students to attain four-year degrees in engineering or computer science.” The MEP “establishes a peer community for its students, most of whom are first in their family to go to college, based on mutual academic support and high standards, encouragement and motivation.” MEP centers receive the majority of funds from their host institutions and receive additional support from local industry partners. MESA provides partial funding and internship/scholarship opportunities.³² As De Anza College and Foothill College are not listed as current MESA partners on the main program website, there may be an opportunity for FHDA to improve its student support services with a MESA partnership.

³² MESA, “MEP,” *op. cit.*

SECTION II: BEST PRACTICES FOR PREPARING UNDERSERVED STUDENTS

As illustrated in the peer profiles in Section I, there are a number of commonalities across retention and success programs in community colleges in California. Common features include tutoring, seminars, guest speakers, workshops, a student study center, career counseling, internship/research opportunities, faculty mentoring, special financial aid packages, K-12 outreach, networking opportunities, and partnerships with other institutions of higher education. In this section, we condense the findings of wide-ranging scholarly studies of best practices for serving underrepresented students, including many recommendations which echo the characteristics of the peer programs profiled above.³³

OVERVIEW OF BEST PRACTICES FOR PREPARING UNDERSERVED STUDENTS

The CCCCOC recently published a report containing recommendations aimed at improving educational outcomes and workforce preparedness in the California community college system, with an especially strong focus on minority and underserved students. This report begins the process of closely aligning K-12 standards with community college requirements. General goals and recommendations listed by CCCCOC include:³⁴

- Development and implementation of a common diagnostic assessment tool to more accurately determine the skill levels of entering students;
- New technology and additional counselors to create more robust student services, including broader and more widespread use of student educational plans;
- Structured pathways to help students identify a program of study and get an educational roadmap to indicate appropriate courses and available support services;
- Enhanced professional development for both faculty and staff, especially related to the instructional and support needs of basic skills students;

³³ FHDA may also want to consider examining the following best practices and literature review documents, all of which echo the findings included in this section. See Rebecca Villarreal, "Charting a Course towards Latino Student Success in STEM," July 2012; USC Center for Urban Education, "Developing Supportive STEM Community College to Four-Year College and University Transfer Ecosystems," December 15, 2011; California Wellness Foundation, "Promoting Practices, Promoting Diversity in California Community College Health Occupation Programs," March 2006; Silicon Valley Education Foundation, "STEMing the Minority Gap," April 2012; California Workforce Initiative, "Diversifying the Nursing Workforce: A California Imperative," February 2001; ASHA, "Minority Student Recruitment, Retention, and Career Transitions Practices: A Review of the Literature," 2003; Boston Public Health Commission, "From High School to Health Care Careers," March 2007; Marya Olivares-Urueta, "The Latino/a Health Professions Pipeline: An Overview," July 2012; Marie-Elena Reyes, "Increasing Diversity in STEM by Attracting Community College Women of Color," 2012; Brian Johnson, "A Snapshot of Minority Males in STEM in Higher Education," 2012.

³⁴ CCCCOC Student Success Task Force, "Advancing Student Success in California Community Colleges" (2011), p. 5. http://www.californiacommunitycolleges.cccoc.edu/Portals/0/StudentSuccessTaskForce/SSTF_FinalReport_Web_010312.pdf

- Revised financing, accountability, and oversight systems to ensure that resources (both financial and organizational) are better aligned with student success;
- Stronger statewide coordination and oversight to allow for the sharing and facilitation of new and creative ideas to help students succeed, including the ability for California to “take to scale” the many good practices already in place; and
- Better alignment of local district and college goals with the education and workforce needs of the state.

In terms of concrete recommendations that will be implemented over the course of the next decade, we have condensed the document down to the most relevant recommendations that apply to FHDA (see Figure 2.1).

Figure 2.1: Relevant CCCCO Recommendations

NUMBER	DETAILS
Recommendation 2.2	Require all incoming community college students to: (1) participate in diagnostic assessment and orientation and (2) develop an education plan. By requiring students to participate in these core services, the community college system will ensure that students have the foundational tools necessary to make informed choices about their education.
Recommendation 2.3	Community colleges will develop and use centralized and integrated technology. Such technology should be accessible through campus or district web portals, to better guide students in their educational process.
Recommendation 2.4	Require students whose diagnostic assessments show a lack of readiness for college to participate in a support resource. Resources can include a student success course, learning community, or other sustained intervention, provided by the college for new students.
Recommendation 3.3	Community Colleges will provide students the opportunity to consider the benefits of full-time enrollment. Many community college students are not in a position to enroll full time, particularly those who work full time and are enrolled to upgrade their job skills as well as those who depend on full-time
Recommendation 6.1	Community colleges will create a continuum of strategic professional development opportunities for all faculty, staff, and administrators to be better prepared to respond to the evolving student needs and measures of

Source: CCCCO³⁵

These recommendations give FHDA some idea of where the CCCCO’s future efforts will be directed, and also provide actionable guidance for Foothill and De Anza Colleges.

³⁵ Adapted from *ibid.*

BEST PRACTICES FOR ASSISTING MINORITY STUDENTS IN NURSING

Of the 112 community colleges in the California system, 75 operate registered nursing programs, enrolling a statewide total of 13,057 full-time-equivalent students (FTEs). As the CCCCCO points out, enrollments have increased by about 44.7 percent over the last four to five years “due to the development of new programs, expansion of enrollment capacity through partnerships with the healthcare industry, and federal and state funded programs and grants.”³⁶

University of Southern California’s School of Policy, Planning and Development published a helpful statewide nursing report for California entitled *Increasing Latino Participation in the Nursing Profession: A Statewide Benchmarking Project*.³⁷ As the authors note, certain barriers are especially salient to the socioeconomic and cultural attributes of the Latino population. In interviews with Latino nurses, nursing students, educators and researchers, the authors of this study identified the following categories of barriers for Latino nursing students in particular (see Figure 2.2).

Figure 2.2: Barriers for Latino Nursing Students in California

FAMILY-RELATED BARRIERS	
Poor perception of Nursing in Home Countries	The nursing profession has made some progress at reversing a public image problem it has struggled with for decades, namely, that nursing is often seen by Latinos as a low-skilled profession.
Discouragement from Families	One casualty of nursing’s struggle results from its public image, in that family and friends often steer potential students away from the profession.
Lack of Family Support	The familial barriers faced by first-generation college students were compounded by limited emotional support
Pressure to Attend Nursing School Locally	Due to the need to help support the family both financially and by caring for older and younger relatives, many Latino students are pressured to attend the local community college, even if it isn’t an ideal fit in terms of programs.
FINANCIAL BARRIERS	
Need to Contribute to Family Income campuses	The main barrier students reported was financial. Latino students were steered away from nursing due to the length and cost of the program
Reluctance to Access Financial Aid campuses	The financial challenges were complicated by the fact that many Latino students did not access or understand financial aid opportunities. They did not seem to understand that entry-level registered nurses can make \$40,000 to \$60,000 per year, which meant they would be well-situated to repay student loans if they chose to accept them.

³⁶ CCCCCO, “Nursing Education Programs” (April 2010).

[http://californiacommunitycolleges.cccco.edu/Portals/0/Reports/Nursing2010toPrint%20\(3\).pdf](http://californiacommunitycolleges.cccco.edu/Portals/0/Reports/Nursing2010toPrint%20(3).pdf)

³⁷ USCSP, “Increasing Latino Participation in the Nursing Profession: A Statewide Benchmarking Project” (August 2006). http://lahealthaction.org/committee_docs/Final_Nursing_ReportHayley_edits_081606.doc

Putting Off Graduate Nursing Education in Favor of Work campuses	The pressure to contribute to family income often prevents working nurses from advancing from the to a higher degree. Many Latinos cannot afford to forgo their salaries to return to school for advance practice nursing education
PRE-COLLEGE EDUCATIONAL BARRIERS	
Being the First in the Family to Attend School	In a recent study, 52 percent of Latino students surveyed reported they were the first person in their family to attend college.
Language Barriers	Language barriers were a particular problem for students from remote or rural areas with isolated first-generation communities, and for students whose families did not speak English at home.
Lack of Adequate High School Preparation	One concern was that minorities who were enthusiastic about entering the profession were not qualified. California's K-12 educational system is not adequately preparing students to enter nursing school, particularly in the areas of math and science.
Low Expectations and Discouragement from Educators	Educators have been found to have low expectations for minorities, and at times track them into non-professional jobs based on race, ethnicity, and/or socioeconomic status.
Lack of Role Models	Minorities, more so than non-minorities, lacked role models and mentors who encouraged them to pursue nursing. This meant that many minorities were not aware of the opportunities available to them.
SOCIO-CULTURAL BARRIERS	
Feeling Out of Place on a College Campus	Socio-cultural factors need to be taken into consideration when looking at the deficiency of Latinos in higher education.
Aversion by Men, Specifically Latino Men, to Nursing	In 1998, male nurses accounted for 0.7 percent of associate degrees in nursing awarded by California colleges and universities, and 0.2 percent of bachelor's degrees in nursing. Minority males in the nursing profession showed similar trends as minority females in that they were less likely to receive degrees in nursing than their white counterparts.
SYSTEMIC BARRIERS IN HIGHER EDUCATION	
Community College Dropout Rates: Access versus Success	Community colleges have higher than average dropout rates. For California community college nursing programs, the attrition rate was 20 percent with some programs as high as 50 percent.
Articulation Gaps in College Programs and Curricula	Closely tied to the issue of Latino underrepresentation in the health care profession and in nursing was that of articulation discrepancies. Articulation is defined as "the intentional planning and coordination of nursing education among programs so that a program at one level serves as the foundation for the next educational level."
Underfunded/Overcrowded Community College System	The vast majority of nursing programs in California are based out of public community colleges; almost two-thirds of California nurses are educated in community colleges. Overcrowding and underfunding is a significant problem for nursing degree completions.

Source: Text closely adapted from USCSP report³⁸

³⁸ Ibid.

This table gives a broad sense of the challenges faced by minority students in nursing and (to an extent) in other fields. Many of these issues can be addressed by FHDA through outreach and institutional changes for students in the area. The USCSP report addresses best practices to ameliorate the problems listed above, developed from a benchmarking analysis of seven nursing AA programs in California. Visits to these schools facilitated the identification of the following “categories of practices that addressed the documented barriers” listed above:³⁹

- Improving an understanding of nursing among Latinos;
- Tailoring nursing education to working students;
- Emphasizing student-centered programs and strong student services;
- Highlighting Latinos in leadership roles;
- Creating culturally aware and supportive learning environments; and
- Working with limited funding by expanding capacity and resources.

The authors conclude that “policy makers, the nursing community, and other stakeholders can lend support to these exemplary practices” by:⁴⁰

- Better educating high school and community college guidance counselors;
- Continuing to improve articulation between the different nursing degrees;
- Making financial aid accessible by addressing cultural barriers to access; and
- Providing greatly needed funding of community college nursing education by promoting and providing strategic leadership in partnerships between public and private sectors.

By addressing these barriers, policy-makers, educators and members of the health care industry can help to increase the participation of Latinos in the nursing workforce.

In terms of more detailed examples of characteristics found at the best community colleges for nursing programs, the authors note a variety of benchmarking standards. According to USCSP research, the best schools are **mission driven** and consider the mission statements to be more than a formality; have a **supportive campus climate** with high levels of diversity; understand student population and **focus on student needs** with specific attention paid to non-traditional students; undertook **partnerships and collaborations** with community and private groups; and have **strong leadership** who work effectively with administration and faculty.⁴¹

³⁹ Ibid.

⁴⁰ Ibid.

⁴¹ Ibid.

BEST PRACTICES FOR HEALTH PROFESSIONS ENROLLMENT AND RETENTION

As the City College of San Francisco points out in its wide-ranging report on increasing diversity in healthcare professions, California's 112 community colleges operate "approximately 250 health occupation programs and train more allied healthcare workers than any other educational or workforce institution in California."⁴² According to the CCCCO, the top statewide health occupations for community college students are, in order of size:⁴³

- Registered Nursing
- Emergency Medical Technician
- Licensed Vocational Nursing
- Medical Assisting
- Radiologic Technologist
- Dental Assisting
- Certified Nurse Assisting
- Respiratory Care Therapy
- Psychiatric Technology
- Dental Hygiene

The majority of these are also high-growth/high-demand fields in Silicon Valley, as noted in a previous report for FHDA. The CCSF report recommends a variety of strategies for developing interest or access for such professions, including distance learning programs, K-12 outreach, community outreach, and minority outreach, all of which were mentioned above.⁴⁴ Recommended retention strategies include:⁴⁵

- Create a supportive and student-centered environment where faculty are deeply committed to student success and diversity is embraced in both the curriculum and the recruitment of new faculty;
- Academic support and early intervention services that identify and address student skill deficiencies through tutoring, mentoring, and automatically triggered remediation activities;
- Support services that help students respond to and address life management issues while they attend demanding health occupation programs; and
- Built-in flexibility that accommodates the difficulties so many community college students confront in juggling school, work, and family responsibilities.

The CCSF report concludes with a list of the ideal characteristics of community college programs that have exemplary health profession enrollment and retention. Suggestions include featuring minority students in promotional materials, outreach to minority-focused high schools, distance learning, recruitment at hospitals and clinics to encourage current healthcare workers to go back to school, partnerships with science departments to provide tutoring for under-prepared students, orientation sessions regarding healthcare programs, career guidance, and dedicated faculty members to provide tutoring and other services.⁴⁶

⁴² CCSF, "Promoting Practices, Promoting Diversity in California Community College Health Occupation Programs" (March 2006). http://www.calwellness.org/pdf_docs/diversity/Diversity_Report_CSS.pdf

⁴³ Ibid.

⁴⁴ Ibid.

⁴⁵ Ibid.

⁴⁶ Ibid.

BEST PRACTICES FOR LATINO STUDENT RETENTION

The Community College Consortium for Immigrant Education, a national network of 23 community colleges and other professional and research organizations, has written a helpful report entitled *Increasing Opportunities for Immigrant Students: Community College Strategies for Success*. In this report, the CCCIE makes a number of recommendations for action, both for community colleges and for other actors. While focused on general strategies, these recommendations also apply for STEM and nursing in particular. According to this study, community colleges should:

Figure 2.3: Latino Student Retention Strategies

DEVELOP AN IMMIGRANT EDUCATION STRATEGY
Articulate explicit goals to serve immigrant students, and incorporate these as part of the college's overall strategic plan.
Forge a targeted, intentionally focused ESL student academic and support plan around completion, to allow ESL students to fulfill their intended goals for further education or career preparation.
Encourage innovation by setting aside funds that allow pilots to be developed and evaluated and, if successful, incorporated into the college's operational budget.
BUILD A COMMUNITY OF SUPPORTERS
Link ESL and immigrant education efforts to various departments and strategic initiatives within the college, including workforce and economic development, developmental education, basic skills, four-year college and university transitions, academic affairs, and student services.
Educate key community college constituencies (e.g. administrators, faculty, staff, and counselors) about both the importance of and the unique challenges faced by immigrant students.
Articulate and share successful outcomes and contributions of immigrant students to dispel myths and raise goodwill.
RESPECT THE EXPERTISE AND LEVERAGE THE STRENGTHS OF COMMUNITY-BASED ORGANIZATIONS
Launch outreach campaigns to immigrant families informing them about postsecondary opportunities and resources.
Organize public marketing campaigns to educate community members, lawmakers, media and employers about the role community colleges have played in the academic and career preparation of successful immigrants.
Establish local consortia of secondary school ESL teachers and college ESL faculty to ensure seamless transitions from school to college.
REDESIGN ESL INSTRUCTION AND CAREER PATHWAYS
Improve collection of immigrant student data so that this information can be used to develop ESL curricula and career pathways to accommodate the major differences in immigrants' English proficiency and educational levels.

<p>Pay close attention to the process used to assess students who have ESL backgrounds with the understanding that standardized tests alone are insufficient indicators for proper placement. Include more comprehensive approaches (e.g. personal interviews, writing samples) that address cultural differences, reflect students' needs and strengths, and build on existing work experience and educational background.</p>
<p>Offer high intensity/managed enrollment (12-24 hours per week) noncredit ESL instruction. These programs show greatly increased learning gains, compared both to national norms and to comparable low intensity programs offered at colleges and community organizations.</p>
<p>Integrate instructional technology to complement and extend ESL classroom time, allow students to build academic and language skills at their own pace, and better accommodate immigrant students' work schedules and family obligations.</p>
<p>Increase hiring of and professional development support for ESL faculty.</p>
<p>EMPOWER IMMIGRANT STUDENTS AS LEADERS</p>
<p>Provide opportunities for students to share their expertise and help one another in the classroom as peer mentors and tutors, and as role models in the community to encourage college, high school and elementary immigrant students to focus on educational achievement.</p>
<p>Offer experiences that will allow students to develop leadership and advocacy skills, including building support and advocating for increased access for all immigrant students, regardless of their status.</p>
<p>Support adult immigrant students as heads of households and leaders/organizers in their communities by preparing and connecting them to jobs, continually aligning training programs to meet current employer demands, and promoting family literacy activities to encourage a college-going culture in immigrant families.</p>

Source: Community College Consortium for Immigrant Education⁴⁷

⁴⁷ CCCIE, "Increasing Opportunities for Immigrant Students: Community College Strategies for Success" (November 2011). http://www.cccie.org/images/stories/Increasing_Opportunities_for_Immigrant_Students_2011.pdf

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