

Increasing Competitiveness of First Generation Community College Students Pursuing a STEM Degree

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STEM...

Science, Technology, Engineering, Mathematics

STEM

- **High-level math-based majors = Calculus**
 - **Science: Biology, Chemistry, Computer Science, Earth Science, Geology, Physics (and Astronomy)**
 - **Technology**
 - **Engineering: Civil, Electrical & Mechanical**
 - **Aerospace Engineering**
 - **Bioengineering**
 - **Computer Engineering**
 - **Mathematics: Applied and Pure**

THE STEM DILEMMA

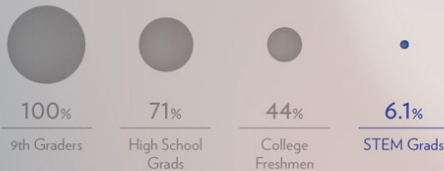
SCIENCE + TECHNOLOGY + ENGINEERING + MATHEMATICS

Promoting STEM subjects is a national priority to ensure American competitiveness in the 21st Century. To maintain a steady pipeline of STEM-capable graduates, we need to start by investing in more quality STEM-capable teachers to educate and spark student interest in these subjects.

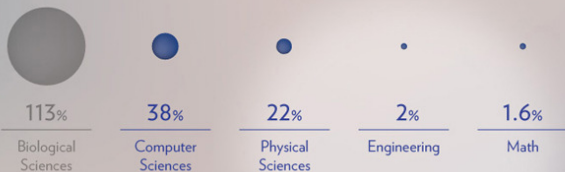
A COLLABORATION BETWEEN GOOD AND HYPERAKT, IN PARTNERSHIP WITH UNIVERSITY OF PHOENIX.

Sources: U.S. Bureau of Labor Statistics, National Science Foundation, National Center for Education Statistics, Business-Higher Education Forum

OF 3.8 MILLION 9TH GRADERS, ONLY 233,000 END UP CHOOSING A STEM DEGREE IN COLLEGE. THAT'S JUST 6 STEM GRADS OUT OF EVERY 100 9TH GRADERS.



ACROSS DEGREE LEVELS, STEM FIELDS HAVE HAD WEAKER THAN AVERAGE GROWTH COMPARED TO OTHER DEGREE FIELDS.



The demand for STEM professionals in the U.S. outpaces supply



Too few university students are graduating in STEM fields

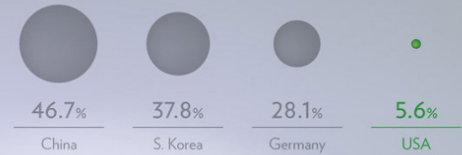


High school students don't have the math proficiency or interest

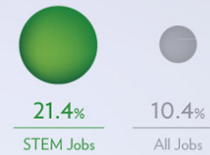


More STEM grads are needed as teachers to inspire and educate students

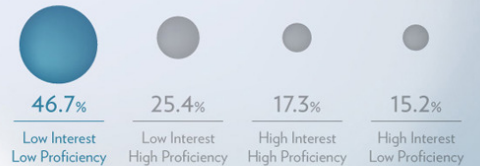
THE U.S. FALLS BEHIND IN THE NUMBER OF COLLEGE GRADUATES WITH STEM DEGREES.



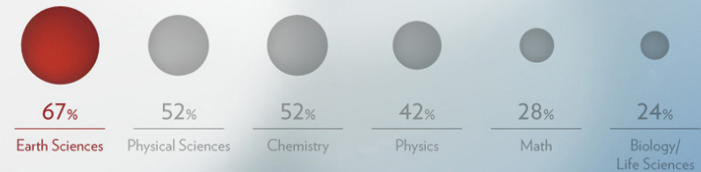
IN THE NEXT FIVE YEARS, STEM JOBS ARE PROJECTED TO GROW TWICE AS FAST AS JOBS IN OTHER FIELDS.



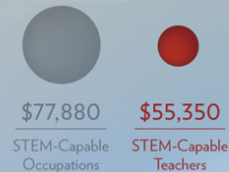
STEM INTEREST AND MATH PROFICIENCY ARE LOW IN 12TH GRADERS.



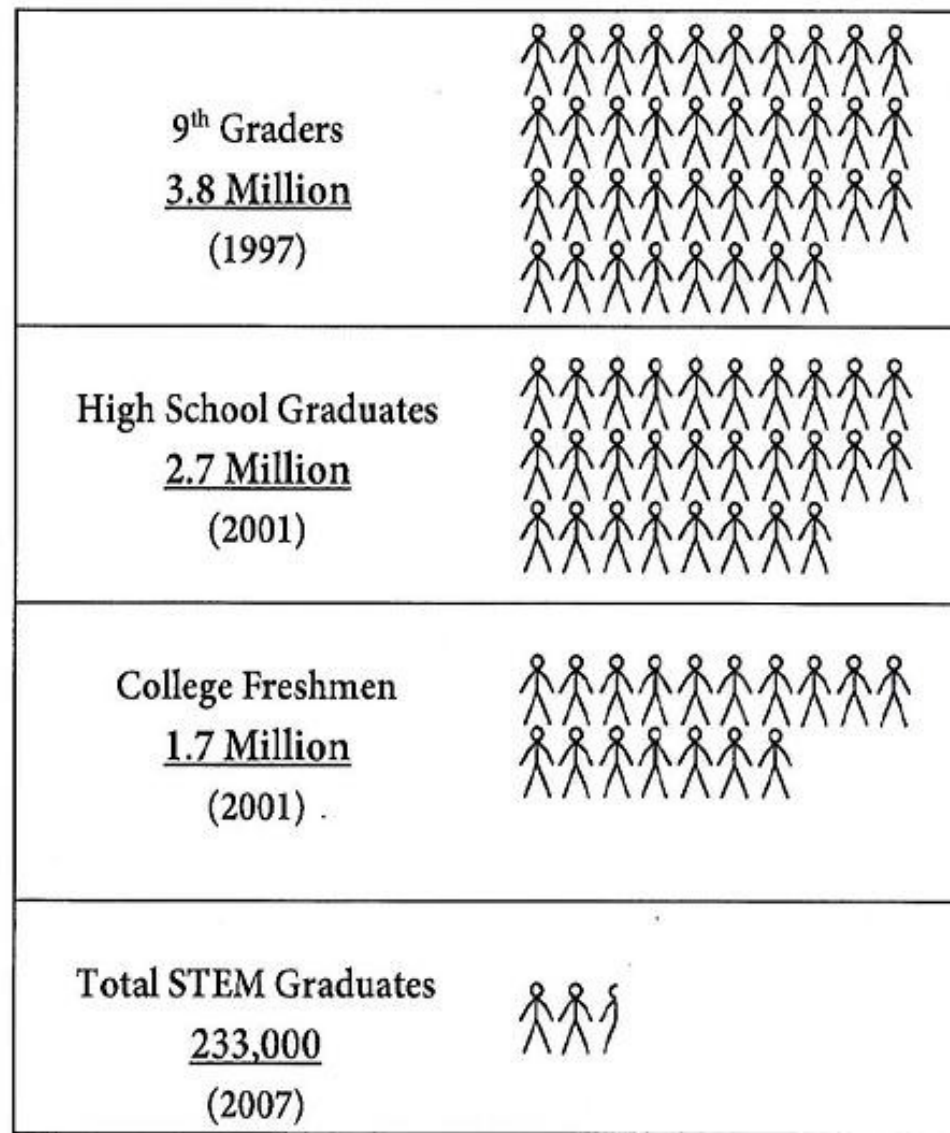
MANY EDUCATORS END UP TEACHING A STEM SUBJECT EVEN IF THEY DID NOT MAJOR IN IT.



STEM-CAPABLE TEACHERS EARN LOWER WAGES THAN OTHER STEM PROFESSIONALS, MAKING IT HARDER TO RECRUIT.

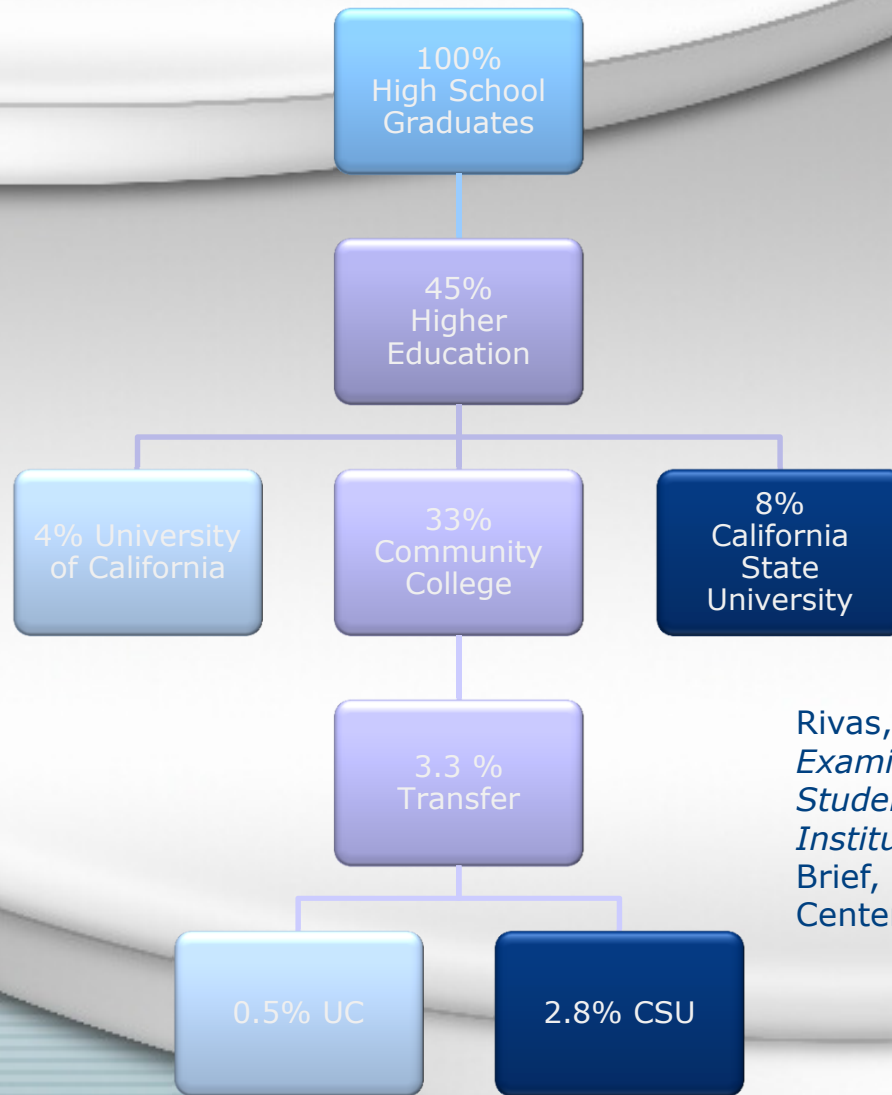


The US STEM Education Pipeline



National Science Board,
2010

The California Latino Transfer Pipeline



Rivas, M.A., et al. (2007, May) *An Examination of Latino/a Transfer Students in California's Postsecondary Institutions*. Latino Policy & Issues Brief, UCLA Chicano Studies Research Center, no. 16.

The California STEM Pipeline in Numbers

- By 6th grade, students that performed at grade level in mathematics
 - 35% of African-American
 - 41% of Latino/a students
 - 67% of White students
 - 80% of Asian students.
- Students that reached proficiency in Chemistry
 - 18% of African-American
 - 23% of Latino/a high school students.

The California STEM Pipeline in Numbers

- Students taking AP exams (2009)
 - 16% of the Latino/a, who represent roughly half (46%) of California's high school population.
- Students enrolled in a STEM discipline across all UC campuses (2009)
 - 1,551 African-American a 2% of all STEM undergraduates.

The MESA model...

Mathematics, Engineering, Science Achievement

Mathematics, Engineering and Science Achievement (MESA) Program



- Grant from the California Community College Chancellors Office (CCCCO), Funds for Student Success (FSS).
- Transfer Ready and Academic Support Program.

Mission

- To provide math, science and engineering academic development to educationally disadvantaged community college students
- To ensure that students excel academically and transfer to a 4-yr university completing a degree in STEM

Goals & Objectives

- Increase the number of underrepresented students who graduate in STEM field
- Increase college retention and transfer to 4-yr institutions
 - Provide academic enrichment in STEM
 - Provide and encourage participation in activities that make students *competitive* university applicants
 - Establish a mentoring program which includes faculty, upper division students, and science professionals

Components

- The 13 components

1. Administrative
2. Student Center
3. Student Clustering
4. Academic Counseling
5. MESA Orientation Course
6. Academic Excellence Workshops
7. Student Support Services
8. Student Outreach and identification of participants
9. MESA Campus Council
10. Professional Development
11. Students Organizations
12. Local Business and Industry Council
13. Pro-Active Liaisons with MSP/MEP and similar programs

About Our colleges...

Bakersfield College

East Los Angeles College

Santa Barbara City College

About Bakersfield College (BC)

- BC serves about 17,400 students each semester, and is part of the Kern Community College District (KCCD).
- The main campus is located on a 153-acre Northeast Bakersfield in California's central valley, and it also operates two satellite campuses: the Weill Institute in downtown Bakersfield, shared by the Kern Community College District, and at the Delano Campus in Delano, California, approximately 35 miles north of Bakersfield.
- BC is an Hispanic Serving Institution with a population of over 42% Hispanics
- The student body is low-income, first-generation college-going, minority, and academically under-prepared.

Facts About BC MESA

- We serve a population of approximately 151 educationally disadvantaged students each academic year at all academic levels, of these about 30 successfully transfer each year.
- By gender
 - Male 70%
 - Female 30%
- By ethnicity
 - Latino/a 62%
 - Asian 13.5%
- By academic institution
 - California State University System 85%
 - University of California System 13%
 - Private University 2%

About East Los Angeles College (ELAC)

- The largest college within the Los Angeles Community College District (LACCD), the largest community college system in the US.
- In 2013-14 ELAC enrolled 54,613 (head-count) students (primarily from feeder schools ranked in the bottom 10% of the state) making the 7th largest college in the nation by enrollment.
- The student population is one of the most diverse in the US, not only with regard to ethnicity but also in age, primary language, enrollment status, and social and economic background.
- Of our students, over 75% of students report financial factors as a barrier to academic success, while 64% report job obligations as a cause preventing success and 61% report an annual family income of less than \$29,000.
- Approximately 85% report being first-generation and 71% attend on a part-time basis.

Facts About ELAC MESA

- We serve a population of ~ 350 educationally disadvantaged students each academic year, at all academic levels. About 50 successfully transfer each year.
- By gender
 - Female 43%
 - Male 57%
- By ethnicity
 - Hispanic 64%
 - Asian 33%
- By academic institution
 - California State University System 55%
 - University of California System 37%
 - Private University 8%

About Santa Barbara City College (SBCC)

- SBCC serves about 18,900 students each semester, and is part of the Santa Barbara Community College District (SBCD), a one district school.
- SBCC is an Hispanic Serving Institution with a population of 35% Hispanics of which 921 are declared STEM majors.
- SBCC surrounding community is considered a bimodal with well-to-do residents and low-income residents.

Facts About SBCC MESA

- We serve a population of approximately 100 educationally disadvantage students each academic year at all academic levels, of these about 20 successfully transfer each year.
- By gender
 - Male 75%
 - Female 25%
- By ethnicity
 - Latino/a 90%
 - Other 10%
- By academic institution
 - California State University System 55%
 - University of California System 32%
 - Private University/Other 13%

Survey...

Identifying common challenges & resources

At the student level...

- How is “first generation” defined on your campus?
- What are challenges that these students face on your campus?
- How important is eligibility versus competitiveness in attaining a STEM degree?

At the programmatic level...

- What are challenges that your program(s) face(s) on your campus?

At the college level...

- What is the importance of diversity in STEM at your college?
- How does the institution and the community benefit from HSI STEM programs in STEM?

Possible answers: At the student level...

- How is “first generation” defined on your campus?
 - Neither parent have a bachelor degree or equivalent degree in any country
 - Parents do not understand college
 - First person in the family to attend college
 - Special populations

Possible answers:

At the student level...

- What are challenges that these students face on your campus?
 - Financial aid
 - Math acting as a gate keeper
 - Lack of role models both Faculty and Students
 - Lack of educational and career planning
 - Under preparation from high school assessing at low level math
 - Family Obligations
 - Employment Issues
 - Knowledge of educational system
 - Work hours
 - Low confidence levels

Possible answers:

At the student level...

- How important is eligibility versus competitiveness in attaining a STEM degree?
 - Financial aid opportunities
 - Transfer process
 - Research & internship opportunities
 - Job opportunities
 - Leadership opportunities (training)
 - Individual and community empowerment

Possible answers:

At the programmatic level...

- What are challenges that your program(s) face(s) on your campus?
 - Outreach
 - Financial support
 - Faculty support
 - Administrative support
 - Space
 - Adequate staffing: staff, tutors, counselors, advisors, etc.
 - Professional development
 - Parent involvement
 - Understanding of the project/grants identified goals, objectives and activities in order to produce appropriate deliverables
 - Quantity versus quality: students served, programming, etc.

Possible answers:

At the college level...

- What is the importance of diversity in STEM at your college?
 - Increase national competitiveness
 - Provide a different point of view on scientific issues
 - Provide equity for minority groups
 - Challenge is understanding that diversity is not reverse discrimination

Possible answers:

At the college level...

- How does the institution and the community benefit from HSI STEM programs in STEM?
 - Increase visibility and quality of programs
 - Leverage for funding from:
 - Grants
 - Foundations
 - Industry

Grants...

- The institution becomes **eligible** and **competitive** by demonstrating:
 - Positive outcomes and deliverables from identified activities
 - Fiscal accountability
 - Proven research track that may allow to:
 - Eligibility for extensions
 - Increase competitiveness for new project for expansion of proven activities
 - Open new doors with new granting agencies
- Many grants allow for additional administrators, faculty and staff; strengthening the implementation infrastructure of the college

Industry...

- Possible Industry funding sources that support MESA and STEM programs.
 - Local Business and Industry Council
 - Corporate Education Funding
 - Alumni
 - Community Partnership with Industry
 - Employee match funding

Foundations...

- Now Foundations have leverage and proven programs of success that may facilitate their work when approaching:
 - Individual Donors
 - Industry
 - Local Foundations
 - Santa Ynez Chumash
 - Wood-Claeyssen
 - Scholarships

Acknowledgements

- MESA Programs
 - BC, CCCCO 14-109-008
 - ELAC, CCCCO 14-109-012
 - SBCC, CCCCO 14-109-022
- BC STEM Programs
 - US ED, Title III, STEM Grant
- ELAC STEM Programs
 - NSF STEP Award, DUE – 1068483
 - US. ED – Title V, HSI P031C110092-12

Questions

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