STEM-Aptitude

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PROFESSOR OF ANATOMY AND PHYSIOLOGY
AT SACRAMENTO CITY COLLEGE
STEM-ulation Program still in it’s infancy

*Although a lot has happened over the last 4 years.
Our Goals
(as the Science and Allied Health Division)

Improve representation in the STEM disciplines

Improve outcomes for all current and future students enrolled in our various STEM courses
Improving Representation

Based on Gender

Based on Self-Reported Ethnicity
Addressing Representation: Gender

SCC Enrollment Spring 2015
- Female: 55%
- Male: 45%

SCC “STEM” Enrollment Spring 2015 (Including Health)
- Female: 49%
- Male: 51%

SCC “STEM” Enrollment Spring 2015 (Excluding Health)
- Female: 43%
- Male: 57%

*California Community College Chancellor’s Office Management Information Systems Data Mart*
Addressing Representation: Self-Reported Ethnicity

*California Community College Chancellor’s Office Management Information Systems Data Mart*
Addressing Success Rates in STEM

- Overall Success Rates- varies
- African American Males – approximately 52%
- Hispanic Males- approximately 63%
- Asian Males- approximately 63%
- White Non-Hispanic Males- approximately 76%

- Not only are initial enrollment data skewed toward overrepresentation of male Asian and White students in STEM, but success rates also represent SIGNIFICANT disparities.

*California Community College Chancellor’s Office Management Information Systems Data Mart*
ADOPT A PHILOSOPHY THAT TAKES COGNITIVE “DEVELOPMENT” INTO CONSIDERATION.

IMPROVE THE “ASSESSMENT” PROCESS.

IMPROVE IDENTIFICATION AND REMEDIATION EFFORTS.

COORDINATE INSTRUCTION ACROSS DISCIPLINES.

AHLC: Proposed Changes in STEM Education Practices
Join the Allied Health Learning Community (AHLCC)

Get an AS Biology and be able to complete the GE requirements to transfer to CSU in 2 ½ years.
In addition, complete the prerequisites for: Occupational Therapist Assistant Program & Physical Therapy Assistant Program, Registered Nurse, Vocational Nurse, Dental Hygienist, Dental Assistant.

Summer 2015 – Fall 2015 Schedule

<table>
<thead>
<tr>
<th>Summer 2015</th>
<th>Fall 2015</th>
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<tbody>
<tr>
<td>HCD 130 Career &amp; Life Planning</td>
<td>BID 100 Human Anatomy &amp; Physiology</td>
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<tr>
<td>8:15-10:05am (June 15-29)</td>
<td>9-10:20, T/TH</td>
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<tr>
<td>ENGW 101 10-15:105 (6/15-7/23)</td>
<td>FCS 324 Human Development</td>
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<tr>
<td>NUTR 300 Nutrition 12:1-2, M/W</td>
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<tr>
<td>HCD 116 Intro to College 12:12-50 T/TH</td>
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<tr>
<td>BID 290 12:00-1:50, T</td>
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What is the schedule?
- Summer Semester: June 15th - July 23rd
- M - Th classes for 6 weeks
- Fall Semester: August 22nd - Dec 18th
- M - Th classes, 9 am - 2:00 pm
- Future semester classes and times will vary

Who can apply?
High School graduates ideally between the ages of 17-22, who have:
- Assessed into MA/TH 100 and have Alg 2 in High School and passed
- Assessed into ENGW 101 and completed ENG 12
- Assessed into ENGRID 110 or 310
- Have at least a 2.0 GPA

How do I apply?
- Download and complete the Allied Health Learning Community application which can be found at www.scc.losrios.edu/ahlc (fill out application through the webpage on-line by April 1st)
- Upload documents that support the information on the application, a copy of your transcripts, assessment scores etc.
- Be prepared to adhere to the requirements of the program throughout the 2015-2016 and 2016-2017 school years.

Questions
Please go to our webpage, www.scc.losrios.edu/ahlc and then email: stonei@scc.losrios.edu

WHY APPLY?

PRIORITY REGISTRATION
For the sections the cohort offers, which means you will be in the front of the line to get the classes you need!

COMPLETE PREREQUISITES FOR AT LEAST 6 HEALTH OCCUPATION PROGRAMS IN 2 ½ YEARS
For many students getting through these prerequisites can take 3 to 4 years due to the difficulty of getting classes.

COMPLETE THE CLASSES IN A STABLE LEARNING COMMUNITY
of students and a team of professional, caring, and committed faculty dedicated to supporting your success.

receive on loan books needed for some Fall classes

FREE TUTORS & STUDY SEMINARS
Allied Health Learning Community

Sacramento City College Allied Health Learning Community - Pathways to Healthcare Careers*

*Students completing pathway must apply and be accepted into chosen allied health program

Average Hourly California Wages*

- Dental Assistant $17.69
- Dental Hygienist $44.32
- Occupational Therapy Assistant $29.64
- Physical Therapist Assistant $27.83
- Registered Nurse $44.25
- Vocational Nurse $24.90

*Wage data retrieved January 2013 from CA Employment Development Department, Labor Market Info at http://www.labormarketinfo.edd.ca.gov/

Requirements: High School GPA of 2.0 or Better; Assess Into Math 100 or Higher; Assess Into English Reading 310, Assess Into EngWr 100 or Higher; Attend Mandatory Orientation
Self-Reported Ethnicity
AHLC PROLO’s: Improved Communication

Cohort 1

Cohort 2

POSITIVE
NEGATIVE
POSITIVE
NEGATIVE
Achievement vs. Aptitude: Past performance doesn’t predict future performance very well.
Achievement Outcomes
Skill Development for Long-Term Performance
Why the Difference in Outcomes?
Achievement misused as measure of preparedness.
STEM Aptitudes: Computation vs. Conceptualization (A Developmental Model)

Spatial Ability

Proportional Reasoning

Pitch Pattern Perception
STEM-Score™ Assessment Correlated with a Number of other Measures

General Cognitive Ability (2)
CTOPP
Placement Scores (Math and English)
STEM-Score Composite
AHLC Findings and Outcomes

- ½ of top scoring STEM-Score™ performers, were below average on SCC’s placement assessments.

- Significant correlations to the other standardized measures.
  - Coefficients ranging from .4 to .6 (p<.05 to p<.01)

- No significant composite score differences between self-reported ethnicities or gender.

- Significant correlations to all 5 “STEM” courses taken.

- Almost no students below the top 1/3 of STEM-Score™ performers made it beyond the CHEM 309 course (both cohorts)
  - Almost all of the highest scorers did pass.
AHLC Student Course Outcomes: Percentage of A’s and B’s versus C’s, D’s, and F’s

“High” Scoring Group (+1 SD)  “Low” Scoring Group (-1 SD)

*Data collected from Summer 2012 to Spring 2015*
Let’s Give it a Try!

- Go to www.stem-score.com
- Click on STEM Symposium Button
- Enter Survey ID when prompted
- Wait for instructions from presenter
- Complete the sample assessment
Can These Skills Be Improved?

If yes, will these improvements impact course performance?
Interventions: Skill Specific and Curricular Based

Skill Development

“Curricular Intervention”
Significant improvement in skills (now similar to non-AHLC controls).

Big Impact on Retention Rates.

Significant Difference in Grade Outcomes for BIO 100 and CHEM 309.

Another Pilot program launch in Fall 2015 via “Student Equity” funding (assessment and remediation)
- However, most likely needs to be implemented in middle and secondary schools to maximize effectiveness.
The Need to Start Earlier

- Establishing relationships with our K-12 partners
Sacramento Area Middle and Secondary Schools

- Approximately 800 students assessed in Spring of 2014 (via Linked Learning and Career Ladders Project Grant Funds)

- 80% of top scoring students (+1 SD) reported receiving A’s and/or B’s in both math and science courses.
  - Significant Correlation with cumulative GPA
  - Significant Correlation with Math/Science GPA

- Only 28-40% of everyone else report receiving A’s and/or B’s in math and/or science courses.

- No significant difference in composite scores between males and females (across the entire sample)
  - Again, significant correlation with other standardized measures

*Data collected Spring 2014
My Personal Work with K-12
CaMSP Summer 2015
(CSUC and Tehama County)
A Model for Implementation?
😊 SSSP and SE at SCC via CCCCCO 😊

- Student Success & Support Program
- Student Equity
Find your STEM (science, technology, engineering and mathematics) score! The 30-minute STEM assessment is offered at no-cost. Bring your ID and earbuds to the Assessment Center at SCC Main Campus, West Sacramento Center or Davis Center during regular walk-in hours.

For more information contact Paul deGennaro, PhD
degennp@scc.losrios.edu
(916) 558-2580
Greetings (student name here),

Thank you for taking the STEM Assessment at Sacramento City College. We appreciate your interest in learning more about the Science, Technology, Engineering and Mathematics opportunities we have available at SCC.

Congratulations! You scored 1.51. Our research indicates that students with a score between 1.5 and 1.99 have an aptitude for STEM, but may require additional support (tutoring, study skills, etc.) if this is a desired major.

We wish to invite you to a special STEM-ULATION event, where we will review what the test indicates, implications for future studies, and how to incorporate strong study habits. We will also highlight STEM-related careers and pathways here at SCC. And, of course, there will be light refreshments and drinks.

You have two choices for this STEM-ULATION event: Friday, November 13, or November 20. Both will be held from 10 a.m. to noon in Lillard Hall 103.

But that's not all! We also want to invite you to a special STEM-POSIUM on Saturday, December 5, from 10 a.m. to 1 p.m. throughout Lillard Hall and the SCC Learning Resources Center. You will be exposed to various labs, experiments and interaction with SCC Faculty. Also, we will provide bag lunches for all in attendance.

Please RSVP at STEMulation@scc.losrios.edu. We hope to see you there.

Sincerely,
Dr. Paul de Gennaro
SCC Biology Professor
(916) 558-2580
Program Overview

-focused on identification to help improve representation

-subsequent training (for faculty and students) to improve success rates in the STEM disciplines
Importance of Middle and Secondary Schools In this Process

- Providing PD with CSUC for Tehama County faculty in the Summer of 2015-2016, as part of the CaMSP grant.
  - Opportunity for expanding partnership to individual schools and/or districts.

- Professional development provided to faculty of HPHS. Including skills based training and curricular considerations.
  - Looking to also work with WUSD on PD as well, at both the middle and secondary school levels.
Consideration for use as an outreach mechanism (for the explicit purposes of identifying those with great aptitude, but possibly disenfranchised for myriad of reasons).
  - Resulting in improved matriculation for students into post-secondary institutions.

Providing professional development that improves student performance based on cognitive skill development and curricular interventions (critical and simple to institute, particularly in the earlier grades).
  - Curricular modifications that deemphasizes sole focus on outcomes, and instead puts an emphasis on process.
Thank You

And please do not hesitate to ask me any questions that you may have.