

**AN EVALUATION OF THE PATHWAYS AND CAREER EXPLORATION IN STEM
(PaCES) PROGRAM:
COHORT B (TIER 1 PROGRAMMING)**

Midpoint Brief

Prepared for:



at



Prepared by:

Beth E. Rabin, Ph.D.
2064 Balmer Dr.
Los Angeles, CA 90039
bethrabin@sbcglobal.net

May 2023

INTRODUCTION

Two community colleges in Los Angeles, Los Angeles Valley College (LAVC) and Los Angeles Pierce College, have implemented an NSF-funded program to support their STEM students: Pathways and Career Exploration in STEM (PaCES). Both community colleges are Hispanic Serving Institutions. Partnering with them in this program are the University of Southern California and BioscienceLA, an organization designed to promote the Southern California life sciences industry. The goals of the PaCES program are to:

- Increase STEM retention of underrepresented minority students
- Increase the transfer rate from 2- to 4-year colleges as STEM majors
- Inform changes and improvements of academic resources to support future STEM majors at 2-year institutions

In the 2022-2023, 21 students experienced the PaCES first year (Tier 1) programming. This group of students was called “Cohort B.”

Methodology

In September 2022 (5 students), and March of 2023 (15 students) completed an **online pretest** survey; 1 student did not complete the pretest at all.

Toward the end of the spring quarter, in April of 2023, an **online posttest** survey was sent to the 21 students who participated in the program as part of Cohort B; all students completed the online survey. Note that this is considered the mid-point of the program as they can continue next year with the Tier 2 programming. Questions included satisfaction with many aspects of the program, impact on attitudes toward STEM, educational goals, career goals, and suggestions for program improvement. The survey included both quantitative and qualitative items.

Participant Demographics

Survey participant demographics from the pretest survey (N=20) are shown below.

Female	40%	African-American/Black	--
Male	55%	Asian-American/Asian	15%
Did not specify	5%	Hispanic or Latino/a/x	65%
		Native American or Alaska Native	--
First year	35%	Pacific Islander	--
Second year	40%	White	30%
Third Year	15%	Other	
Other	10%	<i>(check all that apply)</i>	
LA Valley College	90%	First-generation college	85%
Pierce College	10%		

This document provides a brief summary of the Cohort B data. They will be surveyed again at the end of the Tier 2 programming in the spring of 2024; full analyses and a summary report will be provided at that time. Complete mid-point data are provided in the Appendix.

KEY POINTS

Things to notice about this cohort:

- More than a third are first-year students, compared with none of Cohort A (largely second-year students), and none of the pilot group (largely third-year students)
- Most of these Cohort B students experienced only a month or two of the PaCES programming between pretest and posttest, since three-quarters of Cohort B joined the program in the spring.

As with the pilot group and Cohort A, the PaCES **program elements** scored well with Cohort B.

Even after only a month or two of the PaCES program, students feel better **connected** to the STEM community as a result of program participation.

Many of these students say that, as a result of PaCES, they plan to take part in a variety of **science educational activities**, including enrolling in a variety of STEM classes, applying for a summer internship, and seriously considering a STEM graduate program.

There is still room for the Tier 2 programming to impact these Cohort B students:

- The impact of the Tier 1 programming on **career goals** is less strong than on students experiencing the full Tier 2 programming. Note, however, that there is large drop in the proportion of students saying they are “undecided” in their career goal (45% vs. 14%).
- The impact of the Tier 1 programming on **STEM confidence** is less strong than on students experiencing the full Tier 2 programming.

STUDENT RATINGS OF PROGRAM ELEMENTS

Mid-point ratings:	Mean (0-10)	% 8,9, or 10	N
Science Field Trips	9.3	95%	20
Bio 185 Career/Research Symposia	9.2	100%	15
Counseling 40 at Pierce	9.0	100%	2
Participating in SACNAS	8.4	73%	15
College 101 at LAVC	8.2	67%	9
PaCES Program Overall	9.1	95%	21

PROGRAM IMPACT ON SENSE OF COMMUNITY/SUPPORT

<i>Please indicate how much you disagree or agree with the following statements: (asked before program and at mid-point)</i>	Before Program		Mid-Point	
	Mean (1-5)	% Agree+ Strongly	Mean (1-5)	% Agree+ Strongly
*I have STEM peers who support me	3.8	70%	4.2	76%
*I have a STEM mentor who supports me	3.5	45%	4.1	71%
*I feel a part of the STEM community at my college	3.6	55%	4.1	76%

*Statistically significant pre/post difference, $p \leq .01$.

IMPACT ON ATTITUDES TOWARD SCIENCE

<i>Please indicate how much you disagree or agree with the following statements: (asked before program and at mid-point)</i>	Before Program		Mid-Point	
	Mean (1-5)	% Agree+ Strongly	Mean (1-5)	% Agree+ Strongly
I plan to incorporate science into my career	4.6	90%	4.2	81%
Science is very interesting	4.6	95%	4.3	90%
Someone like me can succeed as a scientist	3.9	75%	3.9	71%
I'm aware of STEM research and internship opportunities for college students	3.4	55%	4.1	85%
I understand the types of careers that are available to scientists	3.5	60%	3.9	76%
I know the steps to take to pursue a career in science	3.3	45%	3.6	56%

†approaches statistical significance, $p = .09$.

IMPACT ON SCIENCE EDUCATIONAL ACTIVITIES

<i>Please indicate your level of interest in doing the following (1=Not at all, 2=A little, 3=Somewhat, 4=Very, 5=Extremely): (asked before program and at mid-point)</i>	Before Program		Mid-Point	
	Mean (1-5)	% Very+ Extremely	Mean (1-5)	% Very+ Extremely
Having a STEM internship/research experience during college	4.4	90%	4.2	71%
Taking STEM courses in college	4.6	95%	4.7	100%
Graduating from a 4-year college with a STEM degree	4.6	90%	4.5	86%
Transferring to a 4-year college	4.7	90%	4.5	86%
Pursue a higher education degree in STEM (Master's or Ph.D.)	3.8	60%	3.8	53%
Pursuing a post-graduate degree in the medical field (physician, nurse, pharmacist, physical therapy, etc.)	3.2	50%	3.0	38%

There were no statistically significant changes from pre- to posttest on these items.

IMPACT ON SCIENCE EDUCATIONAL ACTIVITIES

<i>Which of the following have you done as a result of your participation in the PaCES program? (asked at program mid-point)</i>	Definitely Won't Do	Probably Won't Do	Maybe Plan to Do	Definitely Plan to Do	Already Done
Enroll in a variety of STEM college classes			29%	29%	43%
Apply for a STEM summer internship		5%	43%	43%	10%
Consider a STEM academic pathway different from the pathway I had when I first started college	5%		33%	14%	48%
Seriously consider a STEM graduate program			43%	38%	19%

IMPACT ON STEM CAREER FIELD

What are your career goals? (asked before program and at mid-point)	Before Program	Mid-Point
Health professions/medical	45%	48%
University-based science researcher/professor	20%	19%
Science industry or biotechnology	40%	29%
Environmental science	30%	29%
Veterinary science	15%	14%
K-12 education	--	--
Government/public policy	10%	10%
Energy sector	5%	10%
*Undecided	45%	14%
Other, please specify	5%	5%

*difference between pre- and posttest, $p \leq .05$

IMPACT ON CAREER CHOICE

Thinking about your career plans with regards to STEM in general, where do you place your plans along this scale? (asked before program and at mid-point) (1=Definitely not, 5=Definitely)	Before Program	Mid-Point
Definitely NOT planning to have a career in STEM		
Probably not planning to have a career in STEM	10%	5%
Having a career outside of STEM that still incorporates STEM	20%	14%
Probably planning a career in STEM	30%	24%
Definitely planning to have a career in STEM	40%	57%
*Mean (1-5)	4.0	4.4

*difference between pre- and posttest, $p \leq .05$

Thinking about your career plans with regards to the medical field or health professions, where do you place your plans along this scale? (asked before program and at mid-point) (1=Definitely not, 5=Definitely)	Before Program	Mid-Point
Definitely NOT planning to have a career in the medical field or health professions	20%	14%
Probably not planning to have a career in the medical field or health professions	5%	10%
Having a career outside of the health professions that still incorporates the health professions	20%	19%
Probably planning a career in the medical field or health professions	40%	33%
Definitely planning to have a career in the medical field or health professions	15%	24%
†Mean (1-5)	3.3	3.6

†approaches statistical significance, $p = .06$.

IMPACT ON SELF-CONFIDENCE IN SCIENCE-RELATED ABILITIES

How confident are you in your ability to do the following? 1=Not at all, 2=A little, 3=Somewhat, 4=Very, 5=Extremely (asked before program and at mid-point)	Before Program		Mid-Point	
	Mean (1-5)	% Very+ Extremely	Mean (1-5)	% Very+ Extremely
Pursue a STEM major in college	4.1	75%	4.2	81%
Approach a science professor with a question	3.8	65%	4.1	81%
Transfer to a 4-year college	4.1	80%	4.1	85%
†Succeed in college-level STEM classes	3.5	50%	3.9	67%
Develop a transfer plan to a 4-year college	3.8	60%	4.2	76%
Participate in STEM opportunities beyond coursework while at a 4-year college	3.8	65%	3.9	62%
Quantitative thinking and problem solving	3.7	60%	3.9	62%
*Find STEM resources for transfer students at a 4-year college	3.1	25%	4.0	67%
Explain the scientific method	3.7	65%	3.9	67%
Communicating scientific concepts to the general public (friends/family without a scientific background)	3.6	55%	3.8	62%
Give presentations of scientific work	3.3	40%	3.4	48%
Writing up scientific research results	3.2	45%	3.3	47%
†Conduct science literature searches	3.1	30%	3.6	43%

**statistically significant difference between pre- and posttest, $p \leq .05$; †approaches statistical significance, $p \leq .10$.*