LSAMP/B2B: C6-LSAMP – Reflections on C6's Fall Undergraduate Research Symposium

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Abstract

The *California Central Coast Community College Collaborative* (C6-LSAMP, C6) is a National Science Foundation Louis Stokes Alliances for Minority Participation Bridge to the Baccalaureate grant project (NSF/LSAMP/B2B). C6-LSAMP is a cross-disciplinary collaboration across eight California community colleges. The C6 alliance leverages existing support structures and best practices to address inequities in STEM outcomes for a population of students comprised of the underserved: Hispanic/Latinx and other traditionally underrepresented populations. The primary LSAMP population within the five counties served by the C6 colleges is Hispanic/Latinx. Within these counties, only 16% of Hispanic/Latinx residents 25 years or older hold a bachelor's degree, compared to 51% of White, non-Hispanic residents. At C6 colleges, the Hispanic/Latinx vs White transfer gap is 16% (34% vs. 50%, respectively). Supporting and encouraging LSAMP student populations as they prepare to transfer is vital.

The C6-LSAMP project supports LSAMP students via three pillars: (1) Research Opportunities: Fall Research Symposium and university partnerships, (2) Academic Support: Embedded Tutors in gateway STEM courses, and (3) Professional Development/Career Exploration for students and for faculty: workshops, mentoring, and networking. Reinforcing each pillar is a commitment to create culturally sensitive, relevant and responsive learning environments.

This work-in-progress poster will report results from C6's third Fall Research Symposium – poster presentations, networking and campus tours – held at, and in collaboration with, California Polytechnic State University San Luis Obispo in Fall 2025. This experience has not only exposed community college students to the university itself, but to the idea of doing research and design projects, and presenting their results. As non-poster presenters noted: "I didn't know cc [community college] students were able to present a research poster." and, "I felt encouraged to do my own research and present." Such extra-curricular research and presentation activities are critical in motivating students to continue on their academic path.

1. Introduction

The *California Central Coast Community College Collaborative* (C6) is composed of eight colleges on California's Central Coast: Allan Hancock (AHC), Cabrillo, Cuesta, Monterey Peninsula (MPC), Moorpark, Oxnard, Santa Barbara City (SBCC) and Ventura Colleges. All of the institutions are small-to-medium-sized CCC campuses and Hispanic Serving Institutions (HSI). The initial grant period was August 2021–July 2024; C6 is currently in a one-year No Cost Extension through July 2025.

Although the Central Coast is famous for its tourism, its economy is primarily agricultural, with a developing light manufacturing industry. Many C6 students are children of farm workers and laborers in low-paying manufacturing and service jobs. Hispanic/Latinx students make up the largest URM group at each college, being at least six times larger than any other URM group [1].

C6 focuses on three pillars of support: (1) Research Opportunities, (2) Academic Support, and (3) Professional Development/Career Exploration. Reinforcing each pillar is a commitment to create culturally sensitive and responsive environments for students.

The National Academies of Science, Engineering and Medicine's 2019 report stated that "exposure to undergraduate research is one of the best predictors of degree completion and success in postgraduate education and careers." Undergraduate researchers are motivated to spend more time on their studies, resulting in higher success and completion rates [2]. They gain self-confidence, and are more likely to pursue post-baccalaureate studies ([3]–[6]).

This work-in-progress paper/poster reports on C6's 2024 Fall Research Symposium, which supports the project's commitment to hold Fall Research Symposia to celebrate CC student research experiences, with a specific objective that sixteen students will present research/internships/independent studies projects each year. A discussion of the Fall 2022 and 2023 symposia may be found in our previous paper [7]. In the present work, we describe the symposium in more detail, as well as focus on two questions asked of students in the post-symposium survey. These questions are:

a. *What was the best thing that happened today (open ended)*
b. *What are your feelings about and exposure to research (multiple choice)*

2. Fall Research Symposium

From 2022 through 2024, C6 has co-hosted, with California Polytechnic State University San Luis Obispo (CPSLO), a Fall Research Symposium at the CPSLO campus. The C6 symposium is held in conjunction with CPSLO's SURP+ Symposium (Summer Undergraduate Research Programs). Cal Poly:

- is centrally located in C6's 320-mile long geographic area;
- is a sought after – and selective – STEM transfer institution;
- has only recently reached the threshold to apply for Hispanic Serving Institution (HSI) status – 25% Hispanic/Latinx enrollment – in a state where approximately 40% of the population is Hispanic/Latinx
- has been a strong partner with C6. CPSLO transfer-student advocate Dr. Jane Lehr is the director of both CPSLO's Office of Student Research (which organizes the SURP+ Symposium) and of CPSLO's LSAMP Program. Dr. Jane Lehr also serves as the PI of an NSF S-STEM grant in collaboration with two C6 colleges, AHC and Cuesta.

C6 has brought a total of 600 students and 73 posters to the Cal Poly campus over the symposium's three-year history (*Table 1*). C6 students presented posters on work they have done at university research experiences, community college research experiences, industry internships, design competitions, and other STEM activities outside of the classroom. Each year, at least 75% of C6 posters have been presented by students from underserved backgrounds.

Table 1 C6 Fall Research Symposium Participation

Month, Year	Colleges	CC Student Attendees	CC Student Posters	Posters with URM presenters*
October 2022	7	~150	16	80% (13)
October 2023	8	~250	24	75% (18)
October 2024	8	~210	33	78% (25)

*either solo presenters or as part of a team.

The symposium is an opportunity for community college students to present their work alongside university-enrolled undergraduate researchers from several CPSLO colleges (Engineering;

Science & Mathematics; Agriculture, Food & Environmental Sciences; Liberal Arts; Business). In both 2023 and 2024, C6 posters were highlighted by being centrally located in the symposium exhibition areas, providing community colleges students not only a sense of belonging, but also of being valued. The poster presentations – broken into two one-hour sessions – motivate C6 students who are not poster presenters; they see research being done by fellow community college students displayed on equal footing with research done by 4-year university students.

C6 students, faculty and staff also learn about Cal Poly through discipline- and interest-group specific campus tours set up by the Cal Poly hosts. In 2024, 13 different guided tours were scheduled in the morning (prior to the poster sessions), while 9 tours were scheduled in the afternoon (after poster sessions). Each student had at least two tours to choose from, as well as opportunity to explore the campus on their own.

A mini-resource and graduate fair was also held during the poster-presentation sessions. Both C6 and CPSLO students could visit with representatives from Cal Poly STEM-related programs as well as from graduate programs at Cal Poly and other partner universities.

Equally as important, C6 students, faculty and staff were given time to network with those from other campuses. To encourage these interactions, each C6 student/faculty/staff member was provided with a name badge having the C6 logo and the logo of their particular college. In addition to their first name, students were also asked to write their major on their badge to encourage additional connections.

Of the 33 posters presented in Fall 2024, 13 were from university research experiences, 17 from research done at/sponsored by community colleges, 2 were industry/government internships and 1 was from a national design competition. Posters from the 2024 symposium included:

- Comparing Native and Introduced Species: Biodiversity and Predation Patterns in Alaska vs Panama (AHC)
- Seasonality of nitrogen-fixing Braarudosphaera bigelowii in coastal Monterey Bay, California (Cabrillo)
- Utilizing the Engineering Design Process to Incorporate Pressure Sensors into a Vex Robotic Arm and Track System with Multiple Arduino Uno Microcontrollers (Cuesta)
- Applications of ROV Technology in Environmental Sampling: The Hunt for Trash and Microplastics (MPC)
- Developing a Recyclable Silver-Based MOF for Efficient Capture of PFAS (MPC)
- Relationship of acoustic emissions and radiation patterns (Ventura)

3. Student Feedback/Surveys

After each symposium students are surveyed. A total of 138 students responded to the 2024 survey. A key open-response question asked for the "Best thing that happened" at the symposium. The responses were coded, and are summarized in *Table 2*. Some responses were coded to more than one theme, so the total numbers do not add to 138.

Table 2 Best thing that happened at 2024 Fall Research Symposium; 138 respondents

Theme	Percentage (*n*)
Networking/meeting people (students, faculty, same majors)	60% (83)
Feeling sense of opportunities	55% (76)
Campus tours, meeting/exploring majors	41% (57)

Learning about research/seeing posters	29% (40)
Visiting labs	25% (35)
Checking out campus	25% (35)

While the primary intent of the gathering is to showcase student research experiences, exploring the university campus and connecting with other students and faculty are also critical. Many students have not visited CPSLO in particular, and many have not visited a university at all. Coupled with the poster presentations, campus tours and networking opens students' eyes to what is possible. The connections made across campuses are a key benefit of the alliance structure. The "best thing that happened" responses include:

- *Realizing that there are a lot more opportunities available to do research and internships as a community college student.*
- *Seeing the posters by community college [students] rather than the Cal Poly[students].*
- *Hearing about all the different research projects the students worked on.*
- *Seeing the labs and see how research is done.*
- *Meeting with a Cal Poly student who had previously done 3 years of community college and learning about their experience and entry into research. I realized that even if I decide to pivot my original career plan, I can still accomplish amazing things.*
- *The opportunity to connect with others who showed me that doing research can be interesting and fun and also helped me understand how research should be done.*
- *Seeing all the Comp[uter] Science posters. It was so fine.*
- *Getting a grasp at what being on a university campus felt like.*
- *Seeing people I knew that transferred succeed at Cal Poly.*
- *Being able to connect with others that are interested in the same field that I am. And also see those who are ahead and what can I do in the future.*
- *Getting to see the workshop areas in which students are able to create just about anything.*

Another telling question asked about the students feelings about research, with the question items listed in *Table 3*. Students could select more than one option.

Table 3 Feelings about and exposure to research; Survey; 138 respondents

Item	Percentage (*n*)
I can imagine myself doing research	40% (55)
I like the idea of research that can help my community (testing water, soil, etc.)	38% (52)
I did not know you can do research in community college	24% (33)
I have friends who do research	19% (26)
At least one of my instructors talk(ed) about research in class	18% (25)
I'm already doing research	12% (17)
Not sure exactly what it means to do research	10% (14)
I cannot imagine myself doing research	3% (4)

Forty percent of respondents (55 of 138) can imagine themselves doing research, and 38% (52) liked the idea of doing community-related research, which is considered a success. However, one-quarter of respondents did not know students could do research at community colleges, and less than one in five reported having at least one instructor talk about research in class. These last

two observations provide motivation for the alliance to continue to share and develop research and internship opportunities with students at community colleges.

5. Concluding Remarks

The Research Symposium experiences exposes community college students to research and inspires them to consider research and similar opportunities as viable opportunities. Connecting with students at the university and with peers is critical in ensuring future success after transferring.

6. Acknowledgements

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