

**AN EVALUATION OF THE PATHWAYS AND CAREER EXPLORATION IN STEM
(PaCES) PROGRAM:
COHORT A (TIER 2 PROGRAMMING)**

Executive Summary

Prepared for:



at



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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 two-year offerings 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 2023, 22 students participated in components of the PaCES second year of programming (“Tier 2”), including a research class (Bio 285) that involved several local field trips, a four-day capstone experience at USC’s Wrigley Institute for Environmental Studies on Catalina Island, career and research presentations by graduate students, postdocs, and faculty (Bio 185), support to apply for summer internships, and joining the SACNAS (Advancing Chicanos/Hispanics & Native Americans in Science) chapter at LAVC. The program also offered visits to local four-year colleges which took place after the survey was administered, so they were not included in this study.

Methodology

In September and October of 2022, 27 students completed an **online pretest** survey; one student who began the program in the spring semester completed the pretest survey in March of 2023. Pretest questionnaire completion took an average of 14 minutes and included both quantitative and qualitative items. Questions included participant demographics, educational and career goals, and attitudes toward STEM. For impact comparison purposes, pre-program data from 5 students who did not continue with the program are not included in this report.

Toward the end of the spring semester, in April of 2023, an **online posttest** survey was sent to the 22 students who participated in the full second year of the program; all students completed the online survey, averaging 24 minutes (completion rate = 100%). Questions included satisfaction with specific 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.

In addition, in late April of 2023, 15 of the PaCES students took part in an in-person **focus group discussion**, lasting 1.5 hours. The focus group was led by the independent program evaluator. Discussion topics included program impact, feedback on specific aspects of the program, and suggestions for program improvement.

Participant Demographics

Survey participant demographics are shown below.

Female	55%	African-American/Black	--
Male	41%	Asian-American/Asian	14%
Transgender	5%	Hispanic or Latino/a/x	55%
		Native American or Alaska Native	--
Second year	59%	Pacific Islander	--
Third year	23%	White	23%
Other (all 4+)	18%	Other (includes Armenian)	18%
		<i>(check all that apply)</i>	
LA Valley College	86%	First-generation college	68%
Pierce College	14%		

Most of the respondents (82%) had declared a major; of those, all but three (Nursing majors) were in a STEM field:

Biology (8)	Psychobio
Biology/Animal Science	Psychology (2)
Environmental Science	STEM (2)
Microbiology	

Analyses

Pre/post program comparisons were calculated using Paired Sample t-tests and z-tests. Analyses were run both with and without the one student who joined the program in the spring semester; there were no meaningful differences when that one student was removed, so their data is included in this report.

This document provides a summary of the responses to the pre- and post-program surveys, as well as the focus groups. Complete data are provided in Appendix A (pre-program survey) and Appendix B (post-program survey). Participant comments were copied directly from the online surveys and were lightly edited for spelling and punctuation. Comments from the focus group discussions were transcribed by the evaluator and lightly edited for clarity and flow.

All quantitative data in this report are from the online surveys. Direct quotes from participants are from either the online surveys or the in-person focus group; the source for comments are indicated as follows:

S=from the online surveys
F=from the focus group

SUMMARY OF FINDINGS

Satisfaction with the Program:

Similar to the pilot year (Year 1) of the program (which consisted largely of third-year students), Year 2 of the PaCES program's Tier 2 programming was again a success (with more than half of the participants being second-year students). For almost three-quarters of students, the program exceeded their expectations. The participants benefitted from their experiences in a variety of ways, detailed below, and gave enthusiastic high marks to the program overall, as well as to many specific program elements:

- The field trips were the key to the program's success; students appreciated getting out of the classroom, learning about a variety of STEM fields, and developing relationships with their professors.
- The time at the Wrigley Institute on Catalina Island was a highlight, giving students the opportunity to connect with each other and dig deeply into hands-on science.
- Participants felt strongly that the program was worthwhile and would recommend it to others, especially to students who are unsure about career paths for their STEM major.

Program Benefits and Impact:

Participation in the program influenced students in several ways.

Students' academic and career intentions. As a result of the PaCES program, students:

- have a broader understanding of the range of science careers and how to pursue them, while narrowing their own career focus
- are more likely to think that someone like them can succeed as a scientist
- are aware of STEM research and internship opportunities for college students and are likely to have applied (or plan to apply) for summer internships
- are considering changing their academic pathway and a STEM graduate program
- show more interest in having a STEM career, and less interest in a health-related career

Students' feelings of self-efficacy and connection. As a result of the PaCES program, students:

- felt more supported by and connected to the STEM communities at their colleges
- are more confident in their ability to pursue a STEM career
- are more confident in their research-related skills such as explaining the scientific method, conducting literature searches, and giving presentations of their scientific work

Note that their confidence in transferring to a 4-year college was already high at the beginning of the program, and did not change significantly.

Students' motivation to succeed. As a result of the PaCES program, students:

- felt more motivated and confident to succeed in the often-challenging STEM coursework
- were encouraged to remain in college and not drop out

Participant Suggestions:

- Many students requested collecting actual data on the field trips, so they could have experience with that component of the scientific process; they felt some of the field trips were more “showing” and less “doing.” This suggestion was also made in the program’s pilot year.
- A related request was to spend more time on field trips, or to make better use of as much time as possible at the sites. Some suggestions included giving students the background information ahead of time to maximize exploration and experimentation time.
- Providing transportation to the field trips is key; offering buses starting in the spring was a game-changer.

COMPARING THE PROGRAM TO STUDENTS' EXPECTATIONS

<i>"The program..."</i>	%
...exceeded my expectations	73%
...met my expectations	27%
...did not meet my expectations	

For all students, the program either met (27%) or exceeded (73%) their expectations. Students applied to the PaCES program with a range of expectations.

At the beginning of the program, many said they were looking for information about **career options and opportunities**.

- "Learn career paths in STEM." S
- "I was hoping to get a feel of other STEM professions besides doctor and nurse. I wanted to see what my future career options could be." S
- "I'm interested in sampling the different fields of STEM to determine what my options are." S
- "I am hoping to be exposed to several fields within the scope of STEM in order to gain a greater grasp of what kind of career I would like to pursue." S
- "I hope to gain some perspective from other STEM careers other than nursing." S
- "I hope to understand what types of careers I can get into once I receive a degree in STEM." S
- "I love science and wanted to experience what it is like to be in the different fields."

Others wanted to learn more about **hands-on research**.

- "I am hoping to get hands-on experience and better connect with professionals or experienced people in my major of interest." S
- "Better research techniques." S
- "I'm hoping to get hands on experience in the field with professors in the STEM departments to supplement my classroom experience." S
- "A program like this is perfect to gain some knowledge on how to conduct research. This experience will expand my appreciation for medical science and other important school skills that could be used for my educational career." S

Some students mentioned guidance with **internship opportunities or transferring**.

- "Laboratory research techniques skills and hopefully information and assistance to gain an internship for next year." S
- "Internship experience, and having field experience." S
- "It also allows the opportunity to experience different specialties and helps direct students toward great internships and opportunities." S
- "Getting a lot of opportunities like to transfer and more information about my major."

Networking was also an anticipated benefit of the program.

- "Exposure to others who are in/currently pursuing a similar field to mine. Hoping to gain valuable insight." S
- "One of the many things that I am looking to get from this program is to be able to meet professionals from my field and see if I can just talk to them, ask for advice."

**STUDENT RATINGS OF PROGRAM ELEMENTS:
FIELD TRIPS AND COURSES**

	Mean (0-10)	% 8,9, or 10	N
Science Field Trips	9.1	95%	22
Bio 185 Career/Research Symposia	8.9	84%	18
Bio 285 Research Class	8.4	66%	21

The field trips (offered as part of Bio 185 and Bio 285) were a very popular part of the PaCES program.

- The **science field trips** were rated very strongly. Almost all students rated them an “8” or higher, with 55% rating them a perfect “10.”
 - “The science field trips were a 10 out of 10 for me because not only did it provide a learning experience outside of the classroom, but it provided us with knowledge in the different types of work in certain fields.” S
 - “Every trip felt relatable to what I was learning in Bio 007 at the time. An extremely rewarding program to see the benefits of my studies.” S
 - “Each trip was great in their own way, having a closer look into what specific fields do for their research is the best thing any student in STEM can experience.” S

- The **Bio 185 Career/Research Symposia** in the spring semester was also a very valuable part of the program. Most of the students rated it an “8” or higher, with 50% rating it a perfect “10.” Students appreciated the chance to meet with STEM professionals. Also, buses were provided this quarter, which made it much easier to attend the field trips.
 - “The best class out of the two because we were able to talk to professionals in their fields and how they use scientific applications every day. It was a great learning how to potentially achieve these positions one day.” S
 - “I love meeting people in different fields because I see how passionate they are and it is contagious.” S
 - “Impacted my perception of career opportunities more than Bio 285, made me consider new fields. The bus made it more accessible.” S
 - “I’ve never had the mindset of “Oh, I want to do that.” Going to the water facility and hearing her talk about her family and background, I can kind of relate to that. I don’t have the opportunity to go to my parents or family members that I can ask. It inspired me to follow her path and believing in myself that I could do that, too.” F
 - “Specifically the trip to the Natural History Museum and meeting with the curator. It was the final nail in the coffin to change my major, from nursing to geology. Hearing about what he’s doing in Boyle Heights, the zeolite, I was fascinated about that. There was a lead plant that infected the soil and the zeolite absorbs the lead and makes a healthy soil. It’s really nice to hear what you would do with this major.” F
 - “I kind of had an idea of what I wanted to do coming in, but listening to the professionals expanded what I already thought. I was already interested in

environmental restoration but there are all these different paths within it. When we spoke to the curator there, I had no idea that geologists would be a part of that. There are so many aspects of it. The water treatment plant, too. That's also part of restoration." F

- The **Bio 285 Research Class** in the fall semester was also scored well, although slightly lower than Bio 185. Two-thirds of the students rated it an "8" or higher, with 33% rating it a perfect "10." Participants enjoyed seeing different STEM fields. However, they wished they could have done more hands-on work themselves, and transportation was not provided.
 - "I really enjoyed being out in the field and working on some things hands-on and STEM related. I also really liked researching all the different disciplines of the many STEM majors." S
 - "I loved seeing the different types of stem fields in action because it helped me learn what they are more. I looked forward to every single meeting we had." S
 - "I feel that transportation was an issue. There needed to be buses earlier on." S
 - "My only note for the field trips was I wish they could have incorporated a "project" or a task for us to do while we were out there so we could get experience applying the scientific method and using tools and instruments professionals would be using in the field." S
 - "Loved the diversity of subjects and immersive field trips. Was hoping for more direct examples of/participation in STEM careers/research. The lack of bus was an issue." S
 - "The only thing I wish was that they would talk about the kind of work they would do there. With botany, we would walk around and identify plants but it would have been nice to know what kind of job you can do with that. What do they do in their field besides being a professor." F
 - I was hoping we'd learn more about how to apply it while we were there, and we'd do something that involved research, more than just talking about why it's cool. What kind of jobs instead of just making us more interested, which is valuable." F

**STUDENT RATINGS OF PROGRAM ELEMENTS:
WRIGLEY VISIT, SACNAS CHAPTER**

	Mean (0-10)	% 8,9, or 10	N
Capstone at Wrigley	9.9	100%	19
Participating in SACNAS	8.3	75%	12

- The visit to the **Wrigley** Institute for Environmental Studies on Catalina Island was a program highlight; all students rated it an “8” or higher, and most (89%) rated it a perfect “10.” The visit included a range of “real science” experiences.
 - “The Wrigley experience was literally life changing for me. I had never been to Catalina before so it was fun to go there and do research there. From marine bio, oceanography, physics, astrology, geology, botany, the list goes on and on. Being exposed to these types of fields put a stamp that STEM was a career that was meant for me and I’m sure many of my classmates felt the same way as well.” S
 - “Wrigley was my first experience in Catalina. There was a perfect balance of leisure along with conducting scientific studies. The interactions between staff and students as well as the explored opportunities were amazing.” S
 - “An amazing opportunity in learning a variety of STEM carriers, how research is conducted in them, and how to apply to research opportunities.” S
 - “We did hands on collecting and analyzing data + exploring science fields.” S
 - “Not only was the research experience fun, but we also learned so much from geology, botany, microbiology, and so much more. It also allowed us the space to network and find internship opportunities to become published.” S
 - “It was amazing. I loved the research aspect, being able to collect phytoplankton samples and to hear that it may be in a paper. And being able to work on my social skills as well. I’m not the most social person, so being with my classmates on the island we got to know a few people.” F
 - “It was really valuable and fun and we got to do a lot of different things like doing our own research, going into the labs, using the microscopes. It was really educational. Personal connections with Dr. Kim if we wanted to go to USC.” F

- About half of the students participated in the **SACNAS** chapter, but many of those still feel disconnected from it. Of those who rated it, 75% rated it an “8” or higher.
 - “I go to the meetings here and there and overall, they give out a lot of helpful resources and information that is directly related to STEM.” S
 - “SACNAS always had very informative meetings and allowed the space to meet new people.” S
 - “I joined the meetings and they are really educational. I like that they do fun things, too, like Pi Day. It’s also social and educational.” F
 - “I did not feel connected to SACNAS, it felt more like an obligation. I’m glad it is there as a resource but I do not feel part of that community.” S

- “They meet once a month and honestly I forget about them and I really cannot remember anything worthwhile of any of the meetings.” S
- “In all honesty I heard great things about SACNAS and the events but they were mainly done during work hours for me. therefore I was never able to attend any but Pi day.” S

**STUDENT RATINGS OF PROGRAM ELEMENTS:
OVERALL PROGRAM**

	Mean (0-10)	% 8,9, or 10	N
PaCES Program Overall	9.6	100%	22

- Students rated the **overall program** very highly, with all rating it an “8” or higher. In fact, three-quarters (73%) of participants rated the overall program a perfect “10.”
 - “Being part of PaCES not only motivated me to look into different careers but is the only reason why I did not drop out of school. Being a STEM major is very difficult, I had a lot of struggles while chasing a career in science and was ready to give up. Then I decided to join the program, and built great relationship not just with classmates but professors too. Because I was able to build these relationships with my professors and staff members, it really gave me that boost that even though I had struggles, I can still finish strong. Now I am doing well in school and cannot wait to move on the next chapter.” S
 - “It’s been a very enriching experience. I’ve met many new professors and students. This really brought me out of my comfort zone and helped me gain experiences.” S
 - “The PaCES program was such a great opportunity. Not only did I meet professors to help mentor, but also met so many friends with the same career goals as me and we help each other whether it’s emotionally or school based.” S
 - “Incredible resource and experience, would definitely recommend it to other students. I now feel more confident in my career path, have more of a connection/support system with my peers and professors, and have invaluable experience to bring with me as I transfer.” S
 - “This is definitely a program I wish I had for the first time I was in college because I didn’t know what I could do with STEM outside of healthcare at the time, so this definitely opened me up to learning about different opportunities and fields I could pursue.” S
 - “The PACES program is genuinely one of the best programs ever and the staff are all so understanding and kind.” S

STUDENTS' ATTITUDES TOWARD THE PROGRAM

	Mean (1-5)	% Agree	% Strongly Agree
Would recommend to others	4.9	9%	91%
Worthwhile way to spend my time	4.9	14%	86%
Help me with my career	4.6	41%	59%
Fellow students will provide support	4.3	36%	45%

Students' attitudes toward the program were extremely positive.

- All students would **recommend** (most of them, strongly) the program to other students.
- All the students agreed (most of them, strongly) that the program was a **worthwhile** way to spend their time.
- All the students agreed (over half of them, strongly) that the program would **help their future career**.
- Most students agreed that their fellow students would provide **support** as they continue their studies. Four students were neutral on this item.

In the focus groups, students were asked if they would **recommend** the PaCES program to other students (all said they would), and if so, what kind of students would benefit most.

- "People who are confused and don't necessarily know what to do with their major. I signed up to be a nursing major because my mom is a nurse and four of my *tías* are nurses and three of my cousins are nurses, so obviously I would be a nurse. Doing some of the prerequisites I thought maybe it wasn't for me. Having a class like this does break a wall in your head, maybe there are other things out there. I tell my friends they should take a class like this." F
- "For anyone who thinks a STEM major is just a beeline to the medical field. That was my issue being a STEM major, everyone around me was pre-med and I was biochem the first time around. There are STEM disciplines outside the medical field. What if I like STEM but don't want to be a doctor." F
- "It could also be for people who know what they want to do but have very little experience in that. I like this stuff but I have no experience interacting with professionals or doing research. So coming in and meeting professionals and Catalina it really reinforced what I wanted to do. It can help guide you, you can try it." F
- "People who are looking for experiences. Instead of learning inside a classroom, you get to visit different fields and get to do those things yourself instead of reading about it or hearing about it."

PROGRAM IMPACT ON SENSE OF COMMUNITY/SUPPORT

<i>Please indicate how much you disagree or agree with the following statements: (asked before and after the program)</i>	Before Program		After Program	
	Mean (1-5)	% Agree+ Strongly	Mean (1-5)	% Agree+ Strongly
<i>f</i> I have STEM peers who support me	4.0	64%	4.3 <i>f</i>	78%
I have a STEM mentor who supports me	3.4	37%	4.2	73%
I feel a part of the STEM community at my college	3.5	50%	4.5	87%

**Statistically significant pre/post difference, $p \leq .01$. *f* approaches statistical significance, $p = .06$.*

The program has positively impacted students' feelings of support and connection with regards to STEM.

- Before the program, about two-thirds of the students felt they had a supportive STEM peer group. At the end of the program, about three-quarters felt they had **supportive STEM peers**. Note that this change approaches statistical significance.
- Before the program, about one-third of the students felt they had a supportive STEM mentor. At the end of the program, about three-quarters of students felt they had a **supportive STEM mentor**; this was a statistically significant improvement.
- Before the program, half of the students felt they were a part of the STEM community at their college. At the end of the program, most of the students felt they were a **part of the STEM community** at their college; this was a statistically significant improvement.

In the focus groups, students were asked to reflect on their **interaction with PaCES faculty**. PaCES participants felt that the faculty were strong mentors, motivators, and advocates; getting to know the faculty was one of the main benefits of the PaCES program for many students.

- "The professors, they love their field of expertise. That motivates you to get a job in science. It's contagious." F
- "It's a great way to build a very strong relationship with a professor. For example, I've had Dr. Green before. Being able to see her outside the classroom and ask her personal questions like how she got into it." F
- "To know the professors on a personal level. In the classroom, it's just business. When you go outside, it's more personal, you get to know them as a person. When you run into each other outside of class, it's more personable, easier to interact. Not

only that, but it may lead to other contacts, they can share other ideas that weren't discussed in class." F

- "I had Professor Zung and Professor Lyons before, and they both went on the Catalina trip. It was extra fun because I already knew them but it was also cool to get to connect and share my own interests and get their feedback, especially since I already knew them. It reinforced that relationship and I ended up asking both of them for letters of recommendation for REUs and since they knew me so well it was easy to do that because they could genuinely talk about me. It's a great kind of bond that we all have." F
- "Getting to interact with some of the professors here at Valley, outside of the classroom. I had Dr. Lyons for the marine bio class and he was also there for Catalina and Malibu so it was nice to get to ask him questions and get to know him outside of the classroom. Getting to build a relationship and getting to use them as a resource, as a recommendation down the line; they get to know you better." F

In the focus groups, students were also asked how the PaCES program influenced how they **felt about being a STEM major**. The program provided a sense of a STEM community.

- "It makes me feel better that I'm not the only one going through this. We are all doing it, we all take the same classes. Hey, who did you take for this class, OK, I'll take that one. Or even being in the same class; I'm in classes with all you guys. It's not just me struggling." F
- "The two girls on Catalina who were doing geology, they were PaCES students." F
- "It motivated me. They had transfer students come in and talk to us." F
- "I notice that a lot of first gen students don't have family members in the STEM field so they don't have those figures to look up to. This program provides a plethora of mentors you can look up to, ask them questions or advice. I think that's a really cool part of this," F
- "One of the things that is kind of common, especially for first-time college students, is that the support is not there at home. They don't understand the time it takes to commit to these classes. They don't understand why you can't come to this family gathering. There's that tug-of-war between that life and school life that makes it difficult. The program has offered to talk to my family. It's a hard degree and a hard subject." F

IMPACT ON ATTITUDES TOWARD SCIENCE

<i>Please indicate how much you disagree or agree with the following statements: (asked before and after the program)</i>	Before Program		After Program	
	Mean (1-5)	% Agree+ Strongly	Mean (1-5)	% Agree+ Strongly
I plan to incorporate science into my career	4.7	100%	4.6	95%
Science is very interesting	4.7	95%	4.6	95%
*Someone like me can succeed as a scientist	4.1	82%	4.5	100%
*I'm aware of STEM research and internship opportunities for college students	3.3	41%	4.3	95%
*I understand the types of careers that are available to scientists	3.3	41%	4.3	90%
* I know the steps to take to pursue a career in science	3.2	37%	4.2	82%

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

Participants came to the program already predisposed toward science and science careers.

- All of the students came to the program already intending to **incorporate science into their career**. After the program, most students agreed with the statement; this slight decrease is not statistically significant.
- Before the program began, most students agreed that **science is very interesting**. After the program, most students agreed with the statement; the slight decrease is not statistically significant.

The program significantly increased students' feelings of self-efficacy regarding pursuing science, awareness of STEM internships, as well as the range of science careers and how to pursue them.

- Before the program, most students (82%) felt that **someone like them can succeed as a scientist**. This significantly increased to 100% after the program.
- Initially, less than half (41%) of students were aware of **STEM research and internship opportunities for college students**. As a result of the program, significantly more students, 95%, were aware of these opportunities.
- Before the program, only 41% felt they understood the **types of science careers**; after the program, this significantly increased to 90%.
- Before the program, about one-third of students (37%) knew the **steps to pursue a career** in science. After the program, this increased significantly to 82%.

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 and after the program)</i>	Before Program		After Program	
	Mean (1-5)	% Very+ Extremely	Mean (1-5)	% Very+ Extremely
Having a STEM internship/research experience during college	4.8	95%	4.7	95%
Take STEM courses in college	4.7	95%	4.9	100%
Graduating from a 4-year college with a STEM degree	4.6	95%	4.8	95%
Transferring to a 4-year college	4.6	86%	4.8	95%
Pursue a higher education degree in STEM (Master's or Ph.D.)	4.2	82%	4.1	82%
Pursuing a post-graduate degree in the medical field (physician, nurse, pharmacist, physical therapy, etc.)	3.9	73%	3.6	68%

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

- Before the program began, almost all students (95%) were interested in **having a STEM internship/research experience** during college, taking **STEM courses** in college, and graduating from a **four-year college with a STEM degree**. The slight changes in these items after the program are not statistically significant.
- Before the program, most students (86%) were interested in **transferring to a four-year college**; after the program, 95% of students were interested, most of them, extremely. However, this increase is not statistically significant.
- Interest in pursuing a **higher education degree in STEM** remained consistent from before to after the program—over three-quarters of students were interested in doing so.
- Interest in **pursuing a degree in the medical field** dropped slightly after program participation; however, this decrease was not statistically significant.

IMPACT ON SCIENCE EDUCATIONAL ACTIVITIES

<i>Which of the following have you done as a result of your participation in the PaCES program?</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			9%	27%	64%
Apply for a STEM summer internship			27%	27%	45%
Consider a STEM academic pathway different from the pathway I had when I first started college	5%	9%	18%	23%	45%
Seriously consider a STEM graduate program	5%		23%	36%	36%

Participants reported a variety of impacts of participating in the PaCES program.

- Two-thirds of students (64%) said they have already **enrolled in a variety of STEM classes** as a result of the program and the remaining students said they maybe or definitely plan to do so.
- Just under half of the students (45%) have already **applied for a STEM summer internship** as a result of the program. The remaining students either definitely (27%) or maybe (27%) plan to do so.
- Just under half of the students (45%) report that they are already **considering a different STEM academic pathway** than when they first started college. One-quarter (23%) said they definitely plan to consider a different academic pathway, and another 18% said they might do so.
- One-third of students (36%) report they are **seriously considering a STEM graduate program** as a result of the PaCES program. Another third (36%) are definitely planning to do so, and another 23% might do so.

IMPACT ON STEM CAREER FIELD

<i>What are your career goals? (asked before and after the program)</i>	Before Program	After Program
Health professions/medical	75%	64%
University-based science researcher/professor	50%	32%
Science industry or biotechnology	36%	45%
Environmental science	32%	50%
Veterinary science	9%	5%
K-12 education	9%	5%
Other, please specify	5%	--
Government/public policy	--	9%
Energy sector	--	--
Undecided	--	--

No statistically significant differences between pre- and posttest for this item.

While there were no statistically significant changes in the STEM career field that students preferred, there are some interesting shifts from before to after program participation.

- As compared to before the PaCES program, fewer students are interested in a **health profession** (75% vs. 64%) or **university-based research** (50% vs. 32%).
- More students now say they are interested in a career in **biotechnology** (36% vs. 45%), **environmental science** (32% vs. 50%), or **government/public policy** (0% vs. 9%) as a result of the program.
- Fewer students report being interested in **veterinary science**, or **K-12 education**, or the **energy sector** than before the program.

IMPACT ON CAREER CHOICE

<i>Thinking about your career plans with regards to STEM in general, where do you place your plans along this scale? (asked before and after the program) (1=Definitely not, 5=Definitely)</i>	Before Program	After Program
Definitely NOT planning to have a career in STEM	5%	5%
Probably not planning to have a career in STEM	5%	
Having a career outside of STEM that still incorporates STEM	14%	14%
Probably planning a career in STEM	32%	9%
Definitely planning to have a career in STEM	46%	73%
Mean (1-5)	4.1	4.5

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

<i>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 and after the program) (1=Definitely not, 5=Definitely)</i>	Before Program	After Program
Definitely NOT planning to have a career in the medical field or health professions	14%	18%
Probably not planning to have a career in the medical field or health professions	9%	14%
Having a career outside of the health professions that still incorporates the health professions	9%	9%
Probably planning a career in the medical field or health professions	23%	27%
Definitely planning to have a career in the medical field or health professions	46%	32%
Mean (1-5)	3.7	3.4

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

Respondents were asked about their career intentions in STEM, and in the medical field/health professions.

- At the beginning of the PaCES program, about half of the participants (46%) said they were definitely planning to have a **career in STEM**. After the PaCES program, 73%, said they were definitely planning to have a career in STEM. This increased commitment to a career in STEM was statistically significant.
- Intention to have a **career in the medical field/health professions** *decreased* as a result of the program—fewer students said they were definitely interested in a medical career (46% vs. 32%). This decrease in commitment to a career in the medical/health field was statistically significant.

IMPACT ON SELF-CONFIDENCE IN SCIENCE-RELATED ABILITIES

<i>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 and after the program)</i>	Before Program		After Program	
	Mean (1-5)	% Very+ Extremely	Mean (1-5)	% Very+ Extremely
*Pursue a STEM major in college	4.4	91%	4.7	100%
Approaching a science professor with a question	4.1	77%	4.3	86%
Transfer to a 4-year college	4.1	77%	4.3	86%
Succeed in college-level STEM classes	4.1	82%	4.3	86%
Develop a transfer plan to a 4-year college	4.0	68%	4.2	76%
*Participate in STEM opportunities beyond coursework while at a 4-year college	4.0	77%	4.6	90%
*Quantitative thinking and problem solving	3.9	68%	4.3	81%
Find STEM resources for transfer students at a 4-year college	3.8	55%	4.1	71%
*Explain the scientific method	3.6	55%	4.2	86%
Communicating scientific concepts to the general public (friends/family without a scientific background)	3.5	55%	3.9	57%
*Give presentations of scientific work	3.4	55%	3.8	67%
†Writing up scientific research results	3.4	50%	3.9	67%
*Conduct science literature searches	3.1	37%	3.8	62%

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

Participating in the PaCES program significantly influenced students' self-confidence in their science-related abilities, even in areas where their confidence was already fairly strong.

- Over three-quarters of the students came to the program with fairly strong self-confidence in their ability to **pursue a STEM major in college, approach a science professor with a question, transfer to a four-year college, succeed in college-level STEM classes, and participate in STEM opportunities beyond coursework while at a 4-year college**. After the program, most or all of the students had strong self-confidence in these areas, but the only statistically significant increase was for **pursuing a STEM major in college**.
- At the beginning of the program, half to two-thirds of the students were confident in their abilities in **quantitative thinking and problem solving, develop a transfer plan to a 4-year college, finding STEM resources for transfer students at a 4-year college, explaining the scientific method, communicating scientific concepts to the general public, giving presentations of their scientific work, and writing up scientific research results**. After the program, self-confidence had increased significantly in many of these areas, especially in scientific skills.

- Initial self-confidence was lowest for **conducting science literature searches**, with one-third of students confident in their skills in this area. Self-confidence increased significantly as a result of the program, to almost two-thirds of students feeling confident.
- Note that changes in self-confidence around specific information to support transferring to a 4-year college were *not* statistically significant:
 - Transfer to a 4-year college (77% to 86%)
 - Develop a transfer plan to a 4-year college (68% to 76%)
 - Find STEM resources for transfer students at a 4-year college (55% to 71%)

STUDENTS' COMMENTS ON PROGRAM IMPACT ON ACADEMIC/CAREER GOALS

Students reflected on how the program had influenced their academic/educational goals.

- For many students, PaCES helped them refine their career goals toward **specific STEM fields**.
 - “It influenced my goals by introducing me to new places and outlook on STEM careers.” S
 - “The program has inspired this interest of mine. I’ve always enjoyed the ocean and the Catalina Island trip solidified a career path I would genuinely enjoy doing which is the research opportunity they provide students for oceanography. I felt very inspired by the opportunities of being able to work in the ocean and travel to help the environment through science.” S
 - “The program broadened my horizon as to all the careers within the STEM field.” S
 - “My experience at Wrigley doing hands-on work like plankton tows and microscopy gave me confidence that I wanted to participate in research, especially working with marine/aquatic environments.” S
 - “PaCES made me rethink my major. I was considering nursing and with the many career options introduced to me, I’m considering looking into something other than patient care.” S
 - “I came into community college intending to be a biology major, but I lost my motivation a year in while trying to cram all of the required coursework into 1 year. I then switched to psychology in the summer of 2022, which is also the first time that I encountered the PaCES program. During a PaCES life science research workshop, I encountered Dr. Kamajaya from Pierce College, whose biotechnology training program I ended up joining in fall of 2022. The less structured program taught me lab skills that were transferrable to both research labs and the industry, and it made a career in STEM seem that much more attainable for someone like me. PaCES reinvigorated my interest in biology and I would like to combine both my interests in the life sciences and psychology to pursue either psychobiology or neuroscience/neurobiology.” S
 - “I originally wanted to be a nurse. But after joining the program and being exposed to different career paths, I now have changed my mind and want to work for the water treatment industry. The PaCES program is the reason for this because when we had our fieldtrip to the water treatment that we went to, I did not have any clue that this is a job that was out there.” S
 - “My career goals have drastically shifted away from the medical field into looking for a career that focuses on lab work.” S
 - “Teaching was never something I would be good at, but getting to interact with all of the professors made it not seem so intimidating and it’s actually something I’m considering as well as research.” S
 - “I originally wanted a career in a laboratory but this program has opened my eyes to a lot of opportunities.” S
 - “My love of archeology has come back in full force and I hope to pursue that career path.” S

- The PaCES program helped some students to be **more motivated and confident**.
 - “I went from nearly dropping out (right before I joined the program) to getting better grades, being more in touch with my school, speaking to professors more and more. Asking questions about internships, career jobs, etc.” S
 - “This program has motivated me to pursue better grades to become a competitive applicant when looking into research opportunities.” S
 - “If anything, this has ensured the academic and education goals. Back then, I was very nervous about pursuing a STEM major and I was not sure if I would be able to complete this major but after being in PACES, I feel more confident about it and sure about it.” S
 - “This program actually helped me stay more focused on my classes to excel and do as well as I can. Experiencing the different careers allowed me the space to learn how much I truly love science and the support from my peers in the program helps push me.” S
 - “I feel like this program made me more comfortable in STEM and has made me more confident in my skills. It has made me realize that what I’m doing is hard and that I need to reward myself for the hard work I am doing.” S
 - “It motivated me a lot like taking chemistry and biology, and math are hard and I wanted to give up, but with many support and seeing teachers and people with their career job helped me to keep going.” S
 - “I was introduced to REUs and now I’m going to do one. I have gained confidence and social skills. We all have to interact and all grew into this together. We were given the opportunity at Catalina to present in front of everybody. That’s just another experience for science communication in general.” F
 - “I didn’t know what I wanted to do with my life. I knew I liked science and that was it. This gets you exposed to things and now I’ve chosen a path. Also, I’m really socially anxious and having the trip pulled me out to get to know a lot of you guys.” F
 - “It’s really motivational. Taking all these classes, a lot of them are hard and it’s discouraging to watch your grade go down. But then you see people who have a career, it’s really motivational.” F
 - “When I first joined this program, I was kind of having an existential crisis, thinking, “Do I really want to be a STEM major?” and before college I was really passionate about biology. Watching your GPA go down, you are questioning your confidence. I lost my passion for biology for a bit. After going on the Catalina trip and the other trips, I regained that passion and motivation. I think the PaCES program helped assure me that biology is something that I really want to do. I thank PaCES for that, the motivation for working on this major

- Some students felt encouraged to attend **graduate school** or apply for an internship or summer program.
 - “After meeting professionals that do research and what the job entails, I have included graduate school in my academic goals.” S
 - “I was able to apply and be accepted into the USC Wrigley Institute's Summer Scuba program.” S

HOW COVID INFLUENCED STUDENTS' EDUCATIONAL PATHS

Survey participants were specifically asked about the impact of COVID on their education.

- Online courses were **not as effective as in-person classes**, and had no hands-on component.
 - “Covid influenced it by trying to adapt to taking classes online or hybrid I have always done better on in person classes.” S
 - “My first classes were online so I did not have hands on lab experience until sophomore year.” S
 - “Learning online due to COVID was both a blessing and a curse, as I was able to work nearly full-time while taking advantage of flexible online class schedules. On the other hand, I missed out on invaluable in-person lab experience in both chemistry and biology, something I still regret.” S
 - “A lot of my core classes were online so I didn’t feel the best prepared for the harder in person classes.” S
 - “I struggle a lot with online classes, so it was difficult to motivate myself to study for them. Coming out of the pandemic, I tried my best to avoid online classes altogether and signed up for exclusively in-person experiences, but in my second semester I was forced to take an online general chemistry course, in which I barely passed. Since I had previously gotten all A's, this C had greatly discouraged me and I wasn't even sure if I wanted to pursue biology anymore. The pandemic not only robbed me of my academic experience, but it also robbed me of any motivation or long-term vision for my professional goals.” S
 - “COVID didn’t really influence my educational path, it only made it a bit difficult considering most labs were online.” S
- Others had their **educational plans derailed** or **lost their jobs**; for some this convinced them to pursue their education.
 - “COVID actually derailed my plans for the future. I was supposed to go to a University after HS. But then everything shut down and that’s when I applied to LAVC and was able to experience an opportunity like the PACES program.” S
 - “I lost my full-time job at the beginning of COVID and that's what pushed me to bite the bullet and go back to school for a career change.” S
 - “The COVID pandemic had a lot of influence on my mental health which later influenced my educational plan, leaving to fall behind but now I am catching up.” S
 - “I was furloughed during the pandemic and it made me rethink my educational career. I realized that pursuing a higher education is important.” S
 - “I work in an Animal hospital and after experiencing what happened I was inspired to go back to school and pursue a research career.” S
- A few students were able to see a **“silver lining.”**
 - “It opened my eyes up and got me more serious about my future.” S
 - “During the pandemic is when I decided to pursue nursing. I was working as an EMT at the time.” S

STUDENTS' SUGGESTIONS FOR IMPROVING THE PROGRAM

Students were asked specifically for their suggestions for improving the PaCES program.

- While the field trips were very popular with participants, several wished they could have done **“real research” or data collection on the outings**. A related request was for **more time** at the locations.
 - “Some of the field trips did feel a little rushed. When you're having fun and really into things time flies.” S
 - “Have the first semester build up to an interwoven experience of the different disciplines. Or divide research to have a couple of small research/experiments occurring throughout the semester.” S
 - “Adding tasks or mini projects to complete during the field trips to make them more engaging and beneficial is top suggestion.” S
 - “I think that time management should be improved. We needed more time for some of the trips.” S
 - “It always felt like we were running out of time; perhaps have videos of the procedures and activities that we will be going through that we can watch as homework instead of having the rundown on the trip.” S
 - “On field trips, it would be nice, instead of just looking at all the things, you got to use some tools. We sort of just ran out of time at Malibu Lagoon. We had brought this grid with us; it would have been nice to actually use it.” F
 - “I would have liked it to be more interactive for the students instead of just telling us how it would be, on the field trips. More of a task that applies the science. Not just the field guide, where you would use the field guide to write down things. Like pinning the insects. With botany, she just showed us the plants.” F
 - “Time management. At the Natural History Museum it was really cool but we had to go in groups to meet the curator and the rest of the time we were kind of wandering around. Maybe we could have met with someone else during that time”. F
- Also related to the field trips, students were insistent that having **transportation** (as in the spring) made attendance much easier.
 - “Provide transportation so it is more easily accessible for students who use public transportation.” S
 - “Providing transport to and from the different locations will make attending regularly more accessible.” S
 - “The bus that we now have is absolutely necessary and a great addition to the program. I would also love to see a way to be more inclusive to those who may have mobility issues, such as wheelchair-friendly hiking trails when exploring botany.” S
 - “The bus for field trips!” F
 - “When the program first started, transportation was a big issue. Having the buses was very convenient.” F

- Others wanted to see how the field trip exposure related to **career opportunities**.
 - “My only suggestion would be to change the first year class into more of a focus on how research applications could be applied to certain careers.” S
 - “If anything, just more information on careers with the majors that they introduced us to.” S
 - “I would love to see more of a focus on specific STEM careers rather than broad subjects of study (although that knowledge was valuable as well), especially in the Fall semester. For instance, it was great to learn how to catch and pin insects, but I'm still not sure where I would use this skill or what career I might apply it to.” S

APPENDIX A. PACES ONLINE STUDENT SURVEY
COMPLETE PRE-PROGRAM DATA
Cohort A, 2022-2023 N=22

1. How did you first hear about this program? (check all that apply)
(N=22)

16	(1) From a professor
1	(2) From a student
3	(3) Email announcement
1	(4) Club/organization
	(5) Website
6	(6) Other*

* Rep came to class to present PACES, Information flyer inside a goody bag I received from the Library, Program Coordinator presentation in biology class, A speaker joined our class briefly and spoke about the program, From a counselor, Someone came to my bio 007 class and said what it was

2. What are you hoping to get out of this program? Why did you apply?

Learn career paths in STEM

I'm hoping to grow and learn from this program as a STEM major and really branch out and learn all the other career options out there. I applied to simply gain more knowledge and grow more experiences in this field.

Exposure to others who are in/currently pursuing a similar field to mine. Hoping to gain valuable insight.

I am hoping to get hands-on experience and better connect with professionals or experienced people in my major of interest.

Getting a lot of opportunities like to transfer and more information about my major.

Laboratory research techniques skills and hopefully information and assistance to gain an internship for next year

One of the many things that I am looking to get from this program is to be able to meet professionals from my field and see if I can just talk to them, ask for advice. I've been struggling this last year with school so therefore I am looking for help from those who have a better understanding and see if I can get help.

Better research techniques.

I'm hoping to get hands on experience in the field with professors in the STEM departments to supplement my classroom experience.

An understanding of what research is and hoping to learn experiences that will help out in the future.

I was hoping to get a feel of other stem professions besides doctor and nurse. I wanted to see what my future career options could be

I'm interested in sampling the different fields of STEM to determine what my options are.

I am looking to get field/lab experience, get insight from professionals working in biology fields (specifically ecology), connect with other STEM students, and narrow down a more clear career path for myself.

As a biology major I will most likely do a few research studies. A program like this is perfect to gain some knowledge on how to conduct research. This experience will expand my appreciation for medical science and other important school skills that could be used for my educational career.

I am hoping to be exposed to several fields within the scope of STEM in order to gain a greater grasp of what kind of career I would like to pursue.

I hope to gain some perspective from other STEM careers other than nursing.

Internship experience, and having field experience

One of the reasons I applied is because it's so hands on and gaining experience for fieldwork. It also allows the opportunity to experience different specialties and helps direct students toward great internships and opportunities.

I hope to understand what types of careers I can get into once I receive a degree in STEM.

I love science and wanted to experience what it is like to be in the different fields.

I hope to go to many different STEM fields to learn more about biology and sciences.

To gain valuable research experience and assistance towards a STEM career.

When we ask about "STEM," we mean "Science, Technology, Engineering, and Mathematics."

3. Please indicate how much you disagree or agree with the following statements: (N=22)

<i>(rotated statements in online survey)</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Mean (1-5)
Science is very interesting.			5%	18%	77%	4.7
I plan to incorporate science into my career.				32%	68%	4.7
I understand the types of careers that are available to scientists.		23%	36%	27%	14%	3.3
I know the steps to take to pursue a career science.	5%	18%	41%	23%	14%	3.2
Someone like me can succeed as a scientist.			18%	50%	32%	4.1
I'm aware of STEM research and internship opportunities for college students.	5%	27%	27%	18%	23%	3.3

4. What are your career goals? (check all that apply) (N=22)

50%	(1) University-based science researcher/professor
73%	(2) Health professions/medical
9%	(3) Veterinary science
36%	(4) Science industry or biotechnology
32%	(5) Environmental science
--	(6) Energy sector
--	(7) Government/public policy
9%	(8) K-12 education
--	(9) Undecided
5%	(10) Other, please specify*

*"marine conservation"

5. Please indicate your level of interest in doing the following:
(N=22)

<i>(rotated statements in online survey)</i>	Not at all interested (1)	A little (2)	Somewhat (3)	Very (4)	Extremely interested (5)	Mean (1-5)
Taking STEM classes in college			5%	18%	77%	4.7
Having a STEM internship/research experience during college			5%	14%	82%	4.8
Transferring to a four-year college			14%	9%	77%	4.6
Graduating from a four-year college with a STEM degree			5%	27%	68%	4.6
Pursuing post-graduate work in STEM (Master's degree, Ph.D.)		5%	14%	36%	46%	4.2
Pursuing a post-graduate degree in the medical field (physician, nurse, pharmacist, physical therapy, etc.)	14%	9%	5%	18%	55%	3.9

6. Thinking about your career plans with regards to STEM in general, where do you place your plans along this scale? In this case, "STEM" does NOT include the medical field or health professions. (N=22)

5%	(1) Definitely NOT planning to have a career in STEM
5%	(2) Probably not planning to have a career in STEM
14%	(3) Having a career outside of STEM that still incorporates STEM
32%	(4) Probably planning a career in STEM
46%	(5) Definitely planning to have a career in STEM

7. Thinking about your career plans with regards to the medical field or health professions, where do you place your plans along this scale? This could include a career as a physician, nurse, physical therapist, pharmacist, dentist, etc. (N=22)

14%	(1) Definitely NOT planning to have a career in the medical field or health professions
9%	(2) Probably not planning to have a career in the medical field or health professions
9%	(3) Having a career outside of the health professions that still incorporates the health professions
23%	(4) Probably planning a career in the medical field or health professions
46%	(5) Definitely planning to have a career in the medical field or health professions

8. How confident are you in your ability to do the following? (N=22)

<i>(rotated statements in online survey)</i>	Not at all confident (1)	A little (2)	Somewhat (3)	Very (4)	Extremely confident (5)	Mean (1-5)
Pursue a STEM major in college			9%	46%	46%	4.4
Succeed in college-level STEM classes			18%	55%	27%	4.1
Quantitative thinking and problem solving			32%	46%	23%	3.9
Explain the scientific method		5%	41%	46%	9%	3.6
Conduct science literature searches	9%	9%	46%	32%	5%	3.1
Give presentations of scientific work	5%	18%	23%	46%	9%	3.4
Write up scientific research results	5%	14%	32%	36%	14%	3.4
Approach a science professor with a question		5%	18%	36%	41%	4.1
Communicate scientific concepts to the general		14%	32%	46%	9%	3.5

public (friends/family without a scientific background)						
Develop a transfer plan to a four-year college		9%	23%	32%	36%	4.0
Transfer to a four-year college		5%	18%	36%	41%	4.1
Find STEM resources for transfer students at a four-year college		9%	36%	23%	32%	3.8
Participate in STEM opportunities beyond coursework while at a four-year college		9%	14%	50%	27%	4.0

9. Please indicate how much you disagree or agree with the following statements: (N=22)

<i>(rotated statements in online survey)</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Mean (1-5)
I have STEM peers who support me			36%	32%	32%	4.0
I have a STEM mentor who supports me		14%	50%	23%	14%	3.4
I feel a part of the STEM community at my college	5%	5%	41%	36%	14%	3.5

10. What is your gender? (N=22)

12	(1) Female
9	(2) Male
	(3) Non-binary
1	(4) Prefer to specify:*

*"transgender"

11. What is your year in college for the 2022/2023 academic year?
(N=22)

	(1) First year
13	(2) Second year
5	(3) Third year
4	(4) Other, please specify*

*"previous college degree," "graduate," "5th year, COVID threw me off the rails," "4th"

12. Which of the following best describes your ethnicity? (check all that apply) (N=22)

	(1) African-American/Black
3	(2) Asian-American/Asian
12	(3) Hispanic or Latino/a/x
	(4) Native American or Alaska Native
	(5) Pacific Islander
5	(6) White/Caucasian
4	(7) Prefer to specify:*

*"Sicilian," "Armenian (2)," "Middle Eastern"

13. Do you identify as a first-generation college student? (N=22)

6	(1) No
15	(2) Yes
1	(3) Not sure
	(4) Other, please specify

14. Which community college is your LACCD home institution? (N=22)

19	(1) LA Valley College
3	(2) Pierce College
	(3) Other, please specify:

15. Have you taken/are you taking STEM classes at a different college aside from your home college? (N=22)

11	(1) No
11	(2) Yes, please specify:

Augustana College
 CSULA
 East LA College (2)
 LA Mission College
 LA Pierce College (2)
 LA Trade Tech (2)
 LA Valley College (2)
 Pasadena City College
 West LA

16. Have you declared a major? (N=21)

3	(1) No
18	(2) Yes, please specify:

Biology (8)
 Biology/Animal Science
 Environmental Science
 Microbiology
 Nursing (3)
 Psychobio
 Psychology (2)
 STEM(2)

Ask only if they have declared a major:

17. Have you ever changed your major? (N=18)

11	(1) No
7	(2) Yes, from what did you change it? (please specify):

Biology to Nursing
 Biology to Psychology
 English to Nursing
 Microbiology to Biology
 Nursing to Biology
 Undeclared to STEM

18. Did you participate in a summer enrichment program in chemistry or biology? (N=22)

20	(1) No
1	(2) Yes, at LAVC
1	(3) Yes, at Pierce

19. Please indicate if you have taken or plan to take the following college-level STEM classes:

Note that a few course numbers and offerings differ between LA Pierce College and LA Valley College. (N=21)

	Already Taken (1)	Currently Taking (2)	Definitely Plan to Take (3)	Might Take (4)	Do Not Plan to Take (5)
Anthropology 101 (Human Biological Evolution)	8		1	5	7
Anatomy 1 (Intro to Human Anatomy)	2	3	6	5	5
Astronomy 1 (Elementary Astronomy)	3		1	4	13
Astronomy 5 (Fundamentals of Astronomy)				5	15
Biology 6 (General Biology I)	5	6	5	2	2
Biology 7 (General Biology II)	4	7	5	2	2
Biology 40 (The Science of Biotechnology)	1		5	6	8
Biology 110 (Genetics and Biotechnology)			3	7	10
Chemistry 51 (Fundamentals of Chemistry)	5	1	1	5	9
Chemistry 60 (Intro to General Chemistry)	11	1	2	4	2
Chemistry 68 (Preparation for General Chemistry)	2		1	3	12
Chemistry 101 (General Chemistry I)	12	1	3	1	3
Chemistry 102 (General Chemistry II)	7	3	4	2	4
Chemistry 211 (Organic Chemistry for Science Majors I)		2	10	3	5

Chemistry 212 (Organic Chemistry for Science Majors II)			10	4	6
Computer Science 101 (Intro to Computer Science)				5	15
Computer Science 117 (Intermediate Programming Using C/C++)				3	17
Engineering 101 (Intro to Science, Engineering, and Technology)				1	19
Environmental Sci 1 (Intro to Environmental Science)	2		1	5	12
Geography 1 (Physical Geography)	1	1			19
Geology 1 (Physical Geology)			2		18
Oceanography 1 (Intro to Oceanography)	1		2	6	11
Physiology 1 (Intro to Human Physiology)	3		5	2	11
Physics 6&7 (General Physics I & II)		3	3	5	9
Physics 37,38,39 or 101,102,103 (Physics for Engineers and Scientists I, II, & III)				5	15
Physics 66 & 67 (Physics with Calculus for Life Science Majors I & II)	1	3	3	4	9
Math 261/262 (Calculus 1 & 2)	8	3	2	3	4
Math 227 (Statistics)	9	4	1	4	2
Math 247 (Calculus for the Life Sciences)	2		1	3	14
Other STEM class (please specify)*	3		3	2	7

**Marine Biology, Biotech 002/003, Psych 001/002/004.*

APPENDIX B. PACES ONLINE STUDENT SURVEY COMPLETE DATA
END OF PROGRAM SURVEY
Cohort A, 2022-2023 N=22

When we ask about "STEM," we mean "Science, Technology, Engineering, and Mathematics."

1. Please indicate how much you disagree or agree with the following statements: (N=22)

<i>(rotated statements in online survey)</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Mean (1-5)
Science is very interesting.	5%			19%	76%	4.6
I plan to incorporate science into my career.	5%			23%	73%	4.6
I understand the types of careers that are available to scientists.			10%	48%	43%	4.3
I know the steps to take to pursue a career science.			18%	41%	41%	4.2
Someone like me can succeed as a scientist.				48%	52%	4.5
I'm aware of STEM research and internship opportunities for college students.	5%			50%	45%	4.3

2. What are your career goals? (check all that apply) (N=22)

32%	(1) University-based science researcher/professor
64%	(2) Health professions/medical
5%	(3) Veterinary science
45%	(4) Science industry or biotechnology
50%	(5) Environmental science
--	(6) Energy sector
9%	(7) Government/public policy
5%	(8) K-12 education
--	(9) Undecided
--	(10) Other, please specify

3. Please indicate your level of interest in doing the following:
(N=22)

<i>(rotated statements in online survey)</i>	Not at all interested (1)	A little (2)	Somewhat (3)	Very (4)	Extremely interested (5)	Mean (1-5)
Taking STEM classes in college				14%	86%	4.9
Having a STEM internship/research experience during college			5%	23%	73%	4.7
Transferring to a four-year college		5%		9%	86%	4.8
Graduating from a four-year college with a STEM degree			5%	14%	82%	4.8
Pursuing post-graduate work in STEM (Master's degree, Ph.D.)	5%	9%	5%	32%	50%	4.1
Pursuing a post-graduate degree in the medical field (physician, nurse, pharmacist, physical therapy, etc.)	23%	5%	5%	27%	41%	3.6

4. Thinking about your career plans with regards to STEM in general, where do you place your plans along this scale? In this case, "STEM" does NOT include the medical field or health professions. (N=22)

5%	(1) Definitely NOT planning to have a career in STEM
	(2) Probably not planning to have a career in STEM
14%	(3) Having a career outside of STEM that still incorporates STEM
9%	(4) Probably planning a career in STEM
73%	(5) Definitely planning to have a career in STEM

5. Thinking about your career plans with regards to the medical field or health professions, where do you place your plans along this scale? This could include a career as a physician, nurse, physical therapist, pharmacist, dentist, etc. (N=22)

18%	(1) Definitely NOT planning to have a career in the medical field or health professions
14%	(2) Probably not planning to have a career in the medical field or health professions
9%	(3) Having a career outside of the health professions that still incorporates the health professions
27%	(4) Probably planning a career in the medical field or health professions
32%	(5) Definitely planning to have a career in the medical field or health professions

6. How confident are you in your ability to do the following? (N=21)

<i>(rotated statements in online survey)</i>	Not at all confident (1)	A little (2)	Somewhat (3)	Very (4)	Extremely confident (5)	Mean (1-5)
Pursue a STEM major in college				33%	67%	4.7
Succeed in college-level STEM classes			14%	38%	48%	4.3
Quantitative thinking and problem solving			19%	33%	48%	4.3
Explain the scientific method			14%	48%	38%	4.2
Conduct science literature searches		5%	33%	43%	19%	3.8
Give presentations of scientific work		5%	29%	48%	19%	3.8
Write up scientific research results	5%	5%	24%	29%	38%	3.9
Approach a science professor with a question			14%	43%	43%	4.3
Communicate scientific concepts to the general public (friends/family without a scientific background)			43%	29%	29%	3.9
Develop a transfer plan to a four-year college		5%	19%	29%	48%	4.2
Transfer to a four-year college		5%	10%	33%	52%	4.3
Find STEM resources for transfer students at a four-year college			29%	33%	38%	4.1
Participate in STEM opportunities beyond coursework while at a four-year college			10%	24%	67%	4.6

7. Please indicate how much you disagree or agree with the following statements: (N=22)

<i>(rotated statements in online survey)</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	Mean (1-5)
I have STEM peers who support me			23%	23%	55%	4.3
I have a STEM mentor who supports me		5%	23%	23%	50%	4.2
I feel a part of the STEM community at my college			14%	23%	64%	4.5

8. Which of the following have you done as a result of your participation in the PaCES program? (N=22)

<i>(rotated statements in online survey)</i>	Definitely Won't Do (1)	Probably Won't Do (2)	Maybe Plan to Do (3)	Definitely Plan to Do (4)	Already Done (5)
Apply for a STEM summer internship			27%	27%	45%
Enroll in a variety of STEM college classes			9%	27%	64%
Consider a STEM academic pathway different from the pathway I had when I first started college	5%	9%	18%	23%	45%
Seriously consider a STEM graduate program	5%		23%	36%	36%

9. The PaCES program.. (N=22)

	(1) ...did not meet my expectations
27%	(2) ...met my expectations
73%	(3) ...exceeded my expectations

10. Please indicate your level of agreement with the following statements: (N=22)

<i>(rotated statements in online survey)</i>	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)	Mean (1-5)
The program was a worthwhile way to spend my time.				14%	86%	4.9
Participating in the program will help me with my career.				41%	59%	4.6
I would recommend the program to other students.				9%	91%	4.9
My fellow students in the program will provide support to me as I continue my studies.			18%	36%	45%	4.3

For these items, please rate each aspect of the program from 0 to 10, with 0 as the worst score and 10 as the best. Then explain why you chose that rating. If you did not participate in that component of the program, please choose "NA" (not applicable).

11. The Bio 285 research class in the fall quarter

Mean=8.4, N=22 (21 ratings)

Worst											Best	NA
0	1	2	3	4	5	6	7	8	9	10		
					5%	5%	24%	14%	19%	33%		1

Please explain your rating:

- 10 The field trips so far have been extremely fun and educational, from the water treatment, to being in the lab at the Natural History Museum, have all being field trips that taught me different types of jobs that I am able to pursue as a STEM major. We still have fieldtrips waiting for us soon like the visit at USC, UCSB, and I cannot wait to go to those field trips and speak to students from different schools and ask their experience as STEM majors.
- 10 The trips taken I this class far exceeded my expectations. I did not think I would have as much fun or learn as much as I did. I'm glad I was proven wrong
- 10 I really enjoyed being out in the field and working on somethings hands on and stem related. I also really liked researching all the different disciplines of the many stem majors.
- 10 I loved learning about different fields of science.
- 10 It was fun and educational. I loved seeing the different types of stem fields in action because it helped me learn what they are more. I looked forward to every single meeting we had.
- 9 Great trips we went
- 9 It helped broaden my view on careers in STEM to create a back up plan and see what else I'm interested in. It also allowed me multiple opportunities and internships.
- 9 This class has impacted me greatly and I'm not changing my major.
- 8 I feel that transportation was an issue. There needed to be buses earlier on
- 8 The class was great in general but I was hoping for more details on how these scientific applications could be used for specific careers.
- 8 It was nice to go into the field with professors who each had different STEM backgrounds/interests outside of the healthcare field. My only note for the field trips was I wish they could have incorporated a "project" or a task for us to do while we were out there so we could get experience applying the scientific method and using tools and instruments professionals would be using in the field.
- 7 Exposed to different areas of STEM, but presented as a hobbies rather than careers.
- 7 Wished it had more actual research activities
- 7 Loved the diversity of subjects and immersive field trips. Was hoping for more direct examples of/participation in STEM careers/research. The lack of bus was an issue.

- 7 The only thing I wish I got out of the program was more insight into the various STEM disciplines that the professors delved into as students, but I understand the lack of time allotted for the program.
- 6 I really enjoyed visiting different stem fields and learning about the career paths available.
- 5 It was cold on every trip and rainy on some of them

12. Capstone research experience at Wrigley

Mean=9.9, N=22 (19 ratings)

Worst										Best	NA
0	1	2	3	4	5	6	7	8	9	10	
									11%	89%	3

Please explain your rating:

- 10 The Wrigley experience was literally life changing for me. I had never been to Catalina before so it was fun to go there and do research there. From marine bio, oceanography, physics, astrology, geology, botany, the list goes on and on. Being exposed to these type of fields put a stamp that STEM was a career that was meant for me and I'm sure many of my classmates felt the same way as well.
- 10 It was an eye opening experience and made me consider oceanography as a career path
- 10 Wrigley was my first experience in Catalina. There was a perfect balance of leisure along with conducting scientific studies. The interactions between staff and students as well as the explored opportunities were amazing.
- 10 An amazing opportunity in learning a variety of STEM carriers, how research is conducted in them, and how to apply to research opportunities.
- 10 The different areas of STEM were presented in an overlapping fashion, more indicative of field work.
- 10 This was such an amazing trip and experience to be immersed in nature and science every day in an environment that was so unique to where we live. Supplementing the lectures with "field work" was a great way to keep us engaged and interested in what we were learning as well.
- 10 Wrigley was honestly very life changing for me, here in this trip, it helped me rediscover my passion and motivation in pursuing a STEM degree.
- 10 We did hands on collecting and analyzing data + exploring science fields
- 10 Wrigley made me realize the importance of ocean biodiversity. I really enjoyed all of the presentations provided for us. I enjoyed hearing from scientists in their respective fields.
- 10 The Wrigley Institute Trip was definitely the most fun I had being a part of this program. This program opened my eyes to marine science, helping me to understand the true nature of multi-disciplinary research. As a psych major looking to transition into neuroscience, I didn't know that marine organisms often prove to be valuable model organisms for psychological and neuroscience research, such as the

zebrafish which is used to study neuropharmacology and pharmacokinetics.

10 This was the best part of being in PaCES. I got to learn so many things related to what I want to pursue in a career. I want to transfer to USC at some point and participate in more trips to the facility. It was a great experience overall.

10 This is exactly what I want my career to be

10 Not only was the research experience fun, but we also learned so much from geology, botany, microbiology, and so much more. It also allowed us the space to network and find internship opportunities to become published.

10 That was a once in a lifetime experience that I will never forget. So fun and educational. It was well organized and I learned a lot.

9 Incredible experience. Great introduction to research opportunities, fostered a close community of students and staff, and expanded STEM/science communication experiences.

9 I loved being able to collect and record data.

13. The Bio 185 Career and Research Symposia in the spring quarter

Mean=8.9, N=22 (18 ratings)

Worst										Best	NA
0	1	2	3	4	5	6	7	8	9	10	
						6%	11%	17%	17%	50%	4

Please explain your rating:

- 10 Bio 185 was fun and all but the only thing I wish they talked a little more about was the types of job we can do in their fields. Everything else was fun and educational, from going out in the field and collecting data and what we learn from the data.
- 10 The best class out of the two because we were able to talk to professionals in their fields and how they use scientific applications every day. It was a great learning how to potentially achieve these positions one day.
- 10 The best part of this class is the community that we built, the students are a lot closer and we have developed genuine STEM connections with each other.
- 10 Speakers were great and informed us about opportunities
- 10 The research part of the class was very useful because it gave me the opportunity to see first hand what it would be like to conduct my own research and present it to my fellow classmates.
- 10 better weather
- 10 I love meeting people in different fields because I see how passionate they are and it is contagious.
- 9 Meeting the curator of the Natural History Museum's Gem and Mineral was the nail in the coffin for me to change my major.
- 8 I think things could have been better organized to maximize the little time we had on each field trip
- 8 It definitely exposed multiple career paths that would not have otherwise been presented to us.
- 8 Impacted my perception of career opportunities more than Bio 285, made me consider new fields. The bus made it more accessible.
- 7 I think that the BIO 185 class had the same shortcomings as the BIO 285 class, although it was still a good experience to take part in.
- 7 Having a bus to take us on these trips has been very helpful to us. We get to visit more fields that we haven't learned about and see the work that goes into those stem fields.
- 6 For some of the field trips I feel our time could have been used more wisely. I definitely don't feel as engaged in these field trips as I did in the ones from the fall semester.
I was unable to attend due to schedule conflicts.
I was unable to attend.

14. Science field trips (besides Wrigley)

Mean=9.1, N=22

Worst										Best	NA
0	1	2	3	4	5	6	7	8	9	10	
							5%	32%	9%	55%	--

Please explain your rating:

- 10 The science field trips were a 10 out of 10 for me because not only did it provide a learning experience outside of the classroom, but it provided us with knowledge in the different types of work in certain fields.
- 10 Every trip felt relatable to what I was learning in Bio 007 at the time. An extremely rewarding program to see the benefits of my studies
- 10 Many opportunities and learn great things
- 10 The field trips are the best way to further out there and really physically discover all the different majors there and I get to both learn a lot and have a lot of fun as well.
- 10 The metropolitan water district was very interesting. The process of bringing clean water to people's homes is very rewarding.
- 10 I love the trips besides the Wrigley
- 10 Very fun I love them and look forward to them all the time. I learn a lot and always feel like it is time well spent.
- 9 The field trips presented ideas and areas of STEM. It would have been an over-the-top experience if all the trips built up to something bigger using the scientific method
- 8 They were fun informative and a nice way to learn different job or internship opportunities
- 8 It was nice to be taken to different locations within the valley and to hear from the professors from that particular field. But to reiterate the same note I left before, It would have been nice for the field trips to be more engaging with tasks/assignments for us to do alongside the learning vs just the looking around we did during all of them. I understand time was a major constraint to why this may couldn't happen. Also, transportation during the fall semester would have been extremely helpful.
- 8 Wish we had more time
- 8 Fun, interesting and informative. Some could have had more structure and focused on career/research more.
- 8 The field trips were very engaging, and they helped me to see a more intimate side of the fields that were explored, I just think that some more time could have been given to each so that we could explore even more about each.
- 8 Each trip was great in their own way, having a closer look into what specific fields do for their research is the best thing any student in STEM can experience.
- 8 I loved all of them, I wish I had more time at each one.
- 7 I enjoyed going to the museum and talking to the geologist there. He showed us the work he was doing in the lab. He also explained what work they do outside of the museum.

15. Participating in the SACNAS chapter

Mean=8.3, N=22 (12 ratings)

Worst										Best	NA
0	1	2	3	4	5	6	7	8	9	10	
					25%			17%	8%	50%	12

Please explain your rating:

- 10 Was a really valuable class in learning research opportunities.
- 10 I go to the meetings here and there and overall, they give out a lot helpful resources and information that is directly related to STEM.
- 9 SACNAS always had very informative meetings and allowed the space to meet new people.
- 8 It's a little non existent but I still attend the meetings that I can and it's an educational time.
- 5 I personally just feel disconnected from the chapter, but that's due to my scheduling constraints.
- 5 I did not feel connected to SACNAS, it felt more like an obligation. I'm glad it is there as a resource but I do not feel part of that community.
- 5 They meet once a month and honestly I forget about them and I really cannot remember anything worthwhile of any of the meetings
I have not been an active member
In all honesty I heard great things about SACNAS and the events but they were mainly done during work hours for me. therefore I was never able to attend any but pie day. Only reason I was able to attend that event, was because it was right after my class.
I do not remember a SACNAS chapter
I haven't participated in the SACNAS functions.
I did not participate in the SACNAS chapter at LAVC.

16. The PaCES program overall

Mean=9.6, N=22

Worst										Best	NA
0	1	2	3	4	5	6	7	8	9	10	
								9%	18%	73%	-

Please explain your rating:

- 10 On the field experiences while learning as about certain organisms on the field as we go was my favorite.
- 10 Being part of PaCES not only motivated me to look into different careers but is the only reason why I did not drop out of school. Being a STEM major is very difficult, I had a lot of struggles while chasing a career in science and was ready to give up. Then I decided to join the program, and built great relationship not just with classmates but professors too. Because I was able to build these relationships with my professors and staff members, it really gave me that boost that even though I had struggles, I can still finish strong. Now I am doing well in school and cannot wait to move on the next chapter.
- 10 Far exceeded my expectation
- 10 An amazing program I would highly recommend to anyone who wants to pursue a career a field in STEM but is unsure of what career.
- 10 Great to help with my major and help me what to do in my STEM career
- 10 The PACES program is genuinely one of the best programs ever and the staff are all so understanding and kind.
- 10 Wholesome experience!! :)
- 10 It's such a great opportunity to be a part of a program that encourages students to enter into the field of STEM.
- 10 It's been a very enriching experience. I've met many new professors and students. This really brought me out of my comfort zone and helped me gain experiences.
- 10 Overall I have learned of many things, jobs and careers I would definitely do this again
- 10 The PaCES program was such a great opportunity. Not only did I meet professors to help mentor, but also met so many friends with the same career goals as me and we help each other whether it's emotionally or school based.
- 10 Best decision of my life. I have learned and grown so much. It has made me feel more comfortable about being in STEM.
- 9 I think it's an amazing program for students. But there needs to be more organization and less time constraints.
- 9 It was well done, but it can use some tweaks to make it an even better and stronger program.
- 9 Incredible resource and experience, would definitely recommend it to other students. I now feel more confident in my career path, have more of a connection/support system with my peers and professors, and have invaluable experience to bring with me as I transfer.
- 9 Because it is an optional program, I treated this program as supplementary experience that enriched my perspectives on STEM. This way, I never felt burdened to do anything for the program, because it was something that I wanted to do beyond my normal coursework. It never felt like a chore, and I felt like I was doing something to

improve myself as a student. I would recommend this program to anyone who is unsure of what kind of work they want to go into or even anyone who thinks they are sure, as it provides such valuable information that even convinced me to change my major.

8 This is definitely a program I wish I had for the first time I was in college because I didn't know what I could do with STEM outside of healthcare at the time, so this definitely opened me up to learning about different opportunities and fields I could pursue.

17. How have your ACADEMIC/EDUCATIONAL goals changed as a result of this program? How did the program influence these changes? Please be specific and give examples.

I was able to apply and be accepted into the USC Wrigley Institute's Summer Scuba program

It influenced my goals by introducing me to new places and outlook on STEM careers.

N/A.

My educational changes have not changed. This program has increased my interests on my major.

I went from nearly dropping out (right before I joined the program) to getting better grades, being more in touch with my school, speaking to professors more and more. Asking questions about internships, career jobs, etc...

The program has inspired this interest of mine. I've always enjoyed the ocean and the Catalina Island trip solidified a career path I would genuinely enjoy doing which is the research opportunity they provide students for oceanography. I felt very inspired by the opportunities of being able to work in the ocean and travel to help the environment through science.

The program broadened my horizon as to all the careers within the STEM field.

This program has motivated me to pursue better grades to become a competitive applicant when looking into research opportunities.

It hasn't changed my goals.

I learn more how there's many great jobs to do in the STEM major like the water field trip we went.

I went into this program with the desire to major in biology, with a focus on marine biology and that has not changed since completing this program.

If anything, this has ensured the academic and education goals. Back then, I was very nervous about pursuing a STEM major and I was not sure if I would be able to complete this major but after being in PACES, I feel more confident about it and sure about it.

After meeting professionals that do research and what the job entails, I have included graduate school in my academic goals

Going into the program, I was focused on ecology, habitat restoration, and research as potential areas of study. My experience in this program reinforced my drive toward these subjects. My experience at Wrigley doing hands-on work like plankton tows and microscopy gave me confidence that I wanted to participate in research, especially working with marine/aquatic environments. Our field trips, including exploring the intertidal zone at the coast, catching and pinning insects, and identifying plants while hiking, added to my interest in ecology as an area of study.

PaCES made me rethink my major. I was considering nursing and with the many career options introduced to me, I'm considering looking into something other than patient care.

I want to minor in mathematics and try to get another STEM degree besides one biology based.

I came into community college intending to be a biology major, but I lost my motivation a year in while trying to cram all of the required coursework into 1 year. I then switched to psychology in the summer of 2022, which is also the first time that I encountered the PaCES program. During a PaCES life science research workshop, I encountered Dr. Kamajaya from Pierce College, whose biotechnology training program I ended up joining in fall of 2022. The less structured program taught me lab skills that were transferrable to both research labs and the industry, and it made a career in STEM seem that much more attainable for someone like me. PaCES reinvigorated my interest in biology and I would like to combine both my interests in the life sciences and psychology to pursue either psychobiology or neuroscience/neurobiology.

Paces has helped me decide where I want to transfer when I'm ready. The amount of careers and opportunities available for my major that I did not know about

This program actually helped me stay more focused on my classes to excel and do as well as I can. Experiencing the different careers allowed me the space to learn how much I truly love science and the support from my peers in the program helps push me. PaCES is an amazing program to not only meet amazing friends and mentors, but have the chance to experience the fields and learn about the different internship / job opportunities and also create a more competitive application.

I feel like this program made me more comfortable in STEM and has made me more confident in my skills. It has made me realize that what I'm doing is hard and that I need to reward myself for the hard work I am doing.

Due to this class, I've decided to switch my major from nursing to geology.

18. How have your CAREER goals changed as a result of this program? How did the program influence these changes? Please be specific and give examples.

It has given me a lot of insight into my resources and career
The program gave me more insight as well as introduced me into new careers I never knew about.

N/A.

My educational changes have not changed. This program has increased my interests on my major.

I originally wanted to be a nurse. But after joining the program and being exposed to different career paths, I now have changed my mind and want to work for the water treatment industry. The PaCES program is the reason for this because when we had our fieldtrip to the water treatment that we went to, I did not have any clue that this is a job that was out there.

The program definitely opened my eyes to different career paths that I wouldn't think to have existed. It was an eye opening experience seeing all the research opportunities out there.

Overall, my goals have remained unchanged.

My career goals have drastically shifted away from the medical field into looking for a career that focuses on lab work. This program showed me of a variety of different careers a stem major could be used in which influenced this change.

It hasn't changed my goals.

It motivated me a lot like taking chemistry and biology, and math are hard and I wanted to give up, but with many support and seeing teachers and people with their career job helped me to keep going.

Teaching was never something I would be good at, but getting to interact with all of the professors made it not seem so intimidating and it's actually something I'm considering as well as research.

My career goals have not changed, I still plan on pursuing the route to becoming a pediatrician.

I was into science but I did not know the career path I wanted to take. PACES helped explore many fields and learn different jobs for the different degrees. That helped me decide what to do.

Our trip to both the Natural History Museum and the water treatment plant provided interesting new career opportunities relating to restoration that I had never considered, geologic soil remediation in the former, and water table replenishment in the latter.

My career goals are different ever since I became part of the PaCES program.

I'm not entirely sure.

After integrating myself into the biotech program at Pierce thanks to PaCES, I would like to pursue a career in academic research. PaCES was responsible for making me think of biology as cool again, and ASPIRE (the Pierce biomanufacturing program) was responsible for giving me the skillset necessary to succeed in a biological research laboratory. I intend on finding internships in research, from which will apply my skills. From there, I would make it my goal to potentially apply for a Ph.D program to do research in neuroscience, particularly immunotherapies for neurodegenerative diseases.

Paces helped me make my final decision that I want to keep pursuing my career goal. It showed me the different paths I can take, but I still want to pursue what I was going for in the beginning.

I originally wanted a career in a laboratory but this program has opened my eyes to a lot of opportunities

Though the program didn't change my career goals, it definitely did solidify what I want to become, and gave me many options as back up plans.

I am now considering a career outside of the medical field because of this program. It has opened my eyes to the possibility of research and made me see it in a new light. I thought research was boring but in reality it is really fun and rewarding.

My love of archeology has come back in full force and I hope to pursue that career path.

19. How did the COVID pandemic influence your educational path, if at all?

It opened my eyes up and got me more serious about my future Covid influenced it by trying to adapt to taking classes online or hybrid I have always done better on in person classes.

Covid was the reason to my struggles at LAVC, from not having access to internet at home, from my aunt being sick and hospitalized, from my grandma not having a stable job anymore, I had to focus on helping them out and sadly did not have time for school since I depend on my grandma and my aunt. Therefore after my aunt left the hospital she would often talk about how nice and how comfortable she felt at the hospital because they were a few Latinos that were there to help her and made her feel like everything was going to be okay. So that inspired me to be another Latinx at a hospital, taking care of anyone. Nothing brings me more joy than to help those who need it.

COVID actually derailed my plans for the future. I was supposed to go to a University after HS. But then everything shut down and that's when I applied to LAVC and was able to experience an opportunity like the PACES program.

During the pandemic is when I decided to pursue nursing. I was working as an EMT at the time.

I lost my full-time job at the beginning of COVID and that's what pushed me to bite the bullet and go back to school for a career change.

The COVID pandemic had a lot of influence on my mental health which later influenced my educational plan, leaving to fall behind but now I am catching up.

My first classes were online so I did not have hands on lab experience until sophomore year

Learning online due to COVID was both a blessing and a curse, as I was able to work nearly full-time while taking advantage of flexible online class schedules. On the other hand, I missed out on invaluable in-person lab experience in both chemistry and biology, something I still regret.

I was furloughed during the pandemic and it made me rethink my educational career. I realized that pursuing a higher education is important.

A lot of my core classes were online so I didn't feel the best prepared for the harder in person classes.

COVID was not a particularly productive time for me, as I wasn't taking too many units and I wasn't particularly invested in much outside of class. I struggle a lot with online classes, so it was difficult to motivate myself to study for them. Coming out of the pandemic, I tried my best to avoid online classes altogether and signed up for exclusively in-person experiences, but in my second semester I was forced to take an online general chemistry course, in which I barely passed. Since I had previously gotten all A's, this C had greatly discouraged me and I wasn't even sure if I wanted to pursue biology anymore. The pandemic not only robbed me of my academic experience, but it also robbed me of any motivation or long-term vision for my professional goals.

I work in an Animal hospital and after experiencing what happened I was inspired to go back to school and pursue a research career. COVID didn't really influence my educational path, it only made it a bit difficult considering most labs were online.

Seeing how horrible nurses were treated during Covid it really demolished how well I would be able to handle death.

N/A.

The covid pandemic did not influence my educational path.

It didn't really. My classes were just moved online but other than that it didn't affect me as much.

The pandemic did not influence my path at all. I had to take some online courses, but I still took in person classes.

Covid did not influence my educational path.

The COVID pandemic had no effects since we are just transitioning back to normal life.

20. What suggestions do you have for improving the program in the future?

Only thing I would suggest is time management can be a little better. Some of the field trips did feel a little rushed. When you're having fun and really into things time flies. So for me that would be the only thing (and snacks I guess). Besides that I am very thankful for this program and I hope it does not stop this year. I would love to come back and see the impact it has for the next students taking the program.

Provide transportation so it is more easily accessible for students who use public transportation.

Provide even more exposure to the more lucrative stem fields

My only suggestion would be to change the first year class into more of a focus on how research applications could be applied to certain careers. It should have more activities such as the insect pinning one.

Have the first semester build up to an interwoven experience of the different disciplines. Or divide research to have a couple of small research/experiments occurring throughout the semester.

Adding tasks or mini projects to complete during the field trips to make them more engaging and beneficial is top suggestion. And providing transport to and from the different locations will make attending regularly more accessible.

If anything, just more information on careers with the majors that they introduced us to.

Maybe do a research assignment where students get to have a mentor and practice some lab and data collection, research tools in general applied to a real world situation.

I would love to see more of a focus on specific STEM careers rather than broad subjects of study (although that knowledge was valuable as well), especially in the Fall semester. For instance, it was great to learn how to catch and pin insects, but I'm still not sure where I would use this skill or what career I might apply it to. When I entered the program, especially when visiting the Wrigley Center, I expected to be focused on some time of overarching research/final project that would give students a chance to experience collecting and synthesizing data in a professional way and practice science communication. While we did get the chance to present on a subject of our choice at Catalina, it was rather short and informal. I realize there is a tight time constraint, so it may be a lot to include in the program, but I do see an opportunity for more structure/better time management. For instance, when we visited the Natural History Museum, one group of three went into the geology lab to speak to the curator while the other two groups wandered rather aimlessly. I definitely hoped to meet other curators during that time. Finally, I think there may be room for improvement in accessibility. The bus that we now have is absolutely necessary and a great addition to the program. I would also love to see a way to be more inclusive to those who may have mobility issues, such as wheelchair-friendly hiking trails when exploring botany. Overall though, it was a really wonderful program that I can see changing the lives of some students! It made a big impact on me.

During our trip to Wrigley we had an astronomy class. I would have like for the astronomy professor to have given us instruction on site as opposed to zoom. Dr. Lyons provided the use of a telescope but we had to share it. I would have enjoyed several portable high powered telescopes so we didn't have to share as a group. We had a great view of the sky and we did have great instruction before we got and observe outside the classroom.

More interactions with people in different fields including engineering

I think that there's not much to improve for this program outside of involving Pierce College more and providing transportation for students. Otherwise, I think the program does everything right given its limited time and money.

I think that time management should be improved. We needed more time for some of the trips.

It always felt like we were running out of time; perhaps have videos of the procedures and activities that we will be going through that we can watch as homework instead of having the rundown on the trip

The program was well designed and planned, I would only recommend the field trips to be a bit longer, not only are they enjoyable but we learned so much from them and helped us gage what careers to look into.

I wish transportation was a bit more available and time management so field trips could be less rushed.

I think the program is great at the moment

More field trips but overall the program is perfect as it stands.

N/A.

I think that they are doing a great job currently.

Nothing. The program is amazing and I wish I could do it again.