

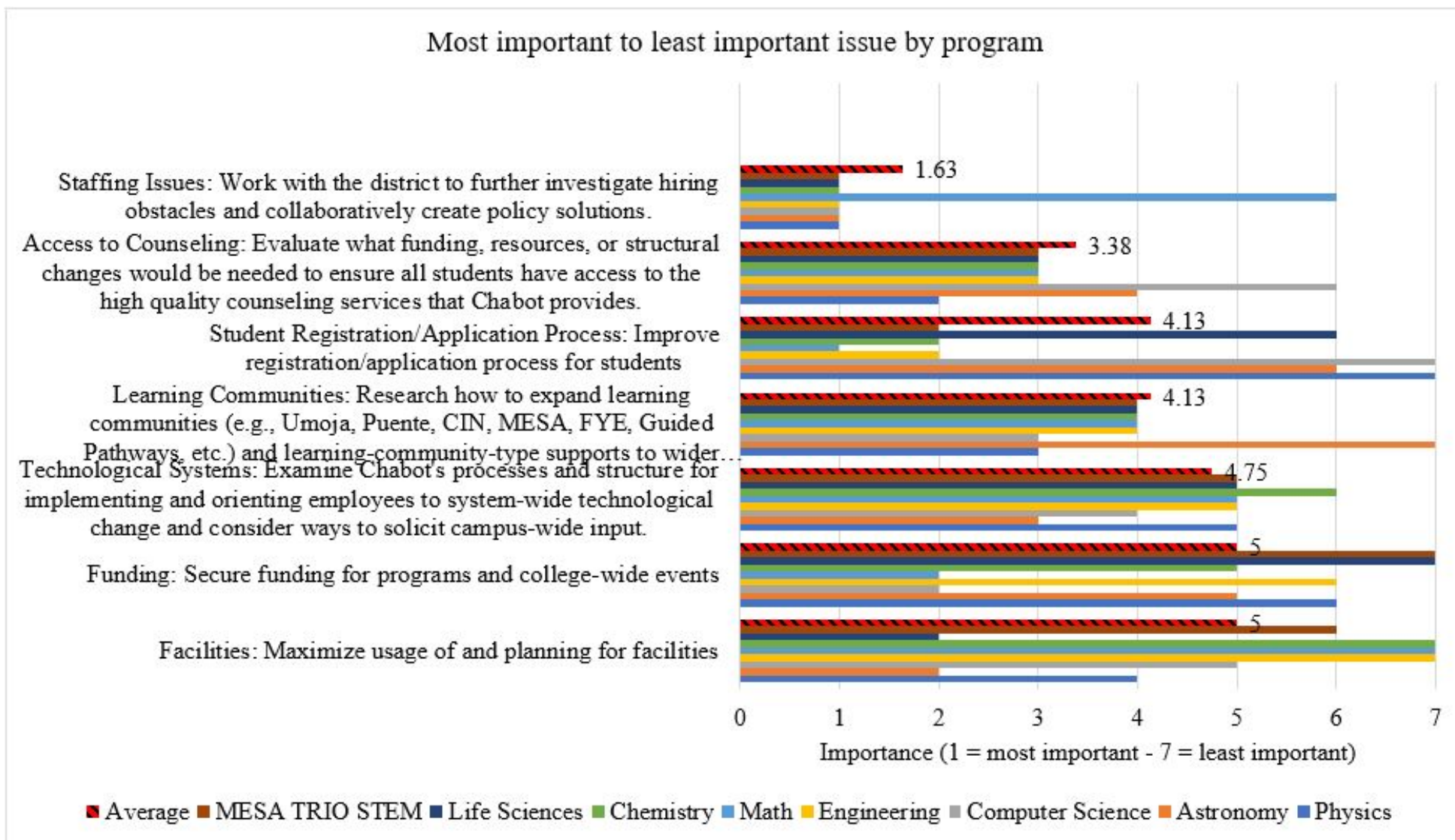
Science and Math Division Summary Report*

*Includes PARs submitted by 11/3/2022

8 Responses

Program/Area Name	Name(s) of the person/people who contributed to review:	Which PAR Template (word template) did you fill out?
Astronomy	Scott Hildreth Shannon Lee	Academic Programs
Chemistry	George Arab, Donna Gibson, Wayne Pitcher, Harjot Sawhney, Andy Wells	Academic Programs
Computer Science	Wanda Wong and Jonathan Traugott	Academic Programs
Engineering	Daniel Quigley Tess Weathers Safiyah Forbes	Academic Programs
Life Sciences	Alexandra Dallara, Gargi Kulkarni, Jeffrey Tsao, Megan Jensen, Patricia Wu, and Robert Cattolica	Academic Programs
Math	Ming, Naj	Academic Programs
MESA TRIO STEM	Donna Gibson, Maria Rodriguez-Larrain	Student/Admin Services/Office of the President
Physics	Scott Hildreth, Shannon Lee, Nicolas Alexander	Academic Programs

Priority Areas to Address Ranked by Programs within Your Division/Area



Other Priority Areas to Address to Carry Out the College Mission

8 Responses

Name of Program, Discipline, Area or Service	Question: If you believe there is an important issue to address to carry out the college mission that is NOT mentioned in the previous list, please describe below (optional).
Astronomy	<p>1) Staffing Issues (with the most important areas to address being Fire Technology and Environmental Studies, which both desperately need more staffing. The former because we will lose accreditation for our Fire Academy, and the latter because Environmental Studies is the area that more and more students want to study, in some way. We need more than one full-time faculty member to drive the program.</p> <p>2) Clearly we need to think creatively about enrollment. The recent outreach event to local high-school counselors arranged by Heather Oshiro showed the value in marketing our campus and our programs to those who could very positively drive enrollment. This should be something we do more than once a year, and something we do with all areas of our campus participating.</p>
Chemistry	As far as staffing issues are concerned, we feel that hiring full-time faculty is an area of particular concern. The current faculty prioritization process is competitive, not cooperative and collegial.
Computer Science	N/A
Engineering	Reduce time and paperwork for approvals. Difficult to plan out activities, field trips, purchasing, etc. when you need to plan months in advance
Life Sciences	N/A
Math	Student support: Basic needs, maintenance of instructional equipment (laptops, calculators)

MESA TRIO
STEM

n/a

Physics

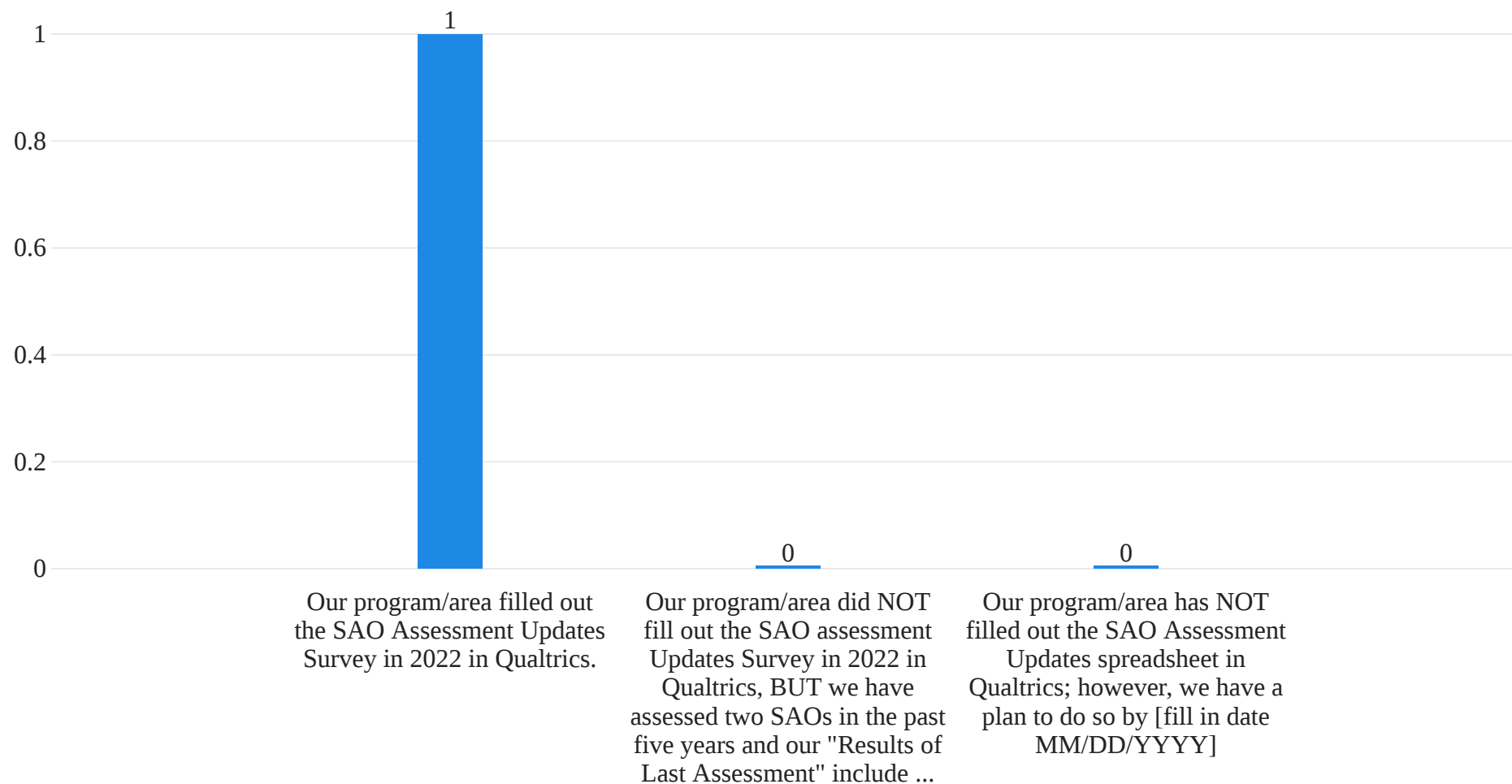
1) Staffing Issues are #1 above with the most important areas to address being Fire Technology and Environmental Studies, which both desperately need more staffing. The former because we will lose accreditation for our Fire Academy, and the latter because Environmental Studies is the area that more and more students want to study, in some way. We need more than one full-time faculty member to drive the program.

2) Clearly we need to think creatively about enrollment. The recent outreach event to local high-school counselors arranged by Heather Oshiro showed the value in marketing our campus and our programs to those who could very positively drive enrollment. This should be something we do more than once a year, and something we do with all areas of our campus participating.

Service Area Outcomes

What is the status of your program's SAO assessment?

1 Responses



Learning Outcomes Assessment Results (SLOs & PLOs)

Is the assessment for all SLOs in your program up to date?

7 Responses



2 Responses

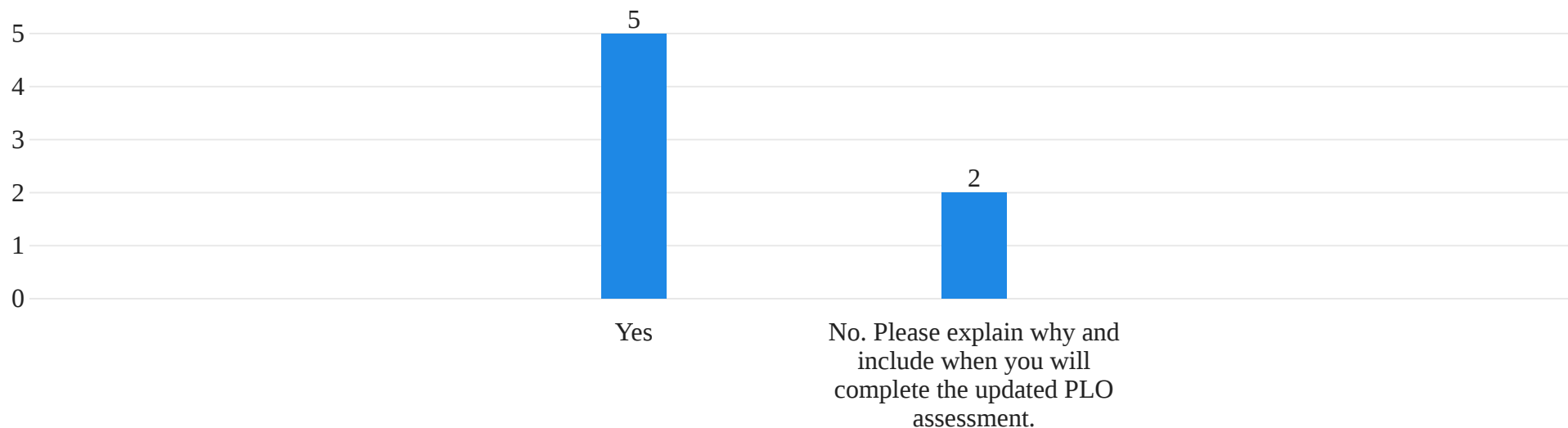
Please fill in courses due for SLO assessments and the date you plan to complete those.

BIOL 25 / BIOS 5 - to be completed during Fall 22 from prior semester data.

We'll need to do a review for Astronomy 45, after Spring 2023, assuming the class does run. We need to review all of our SLOs in light of student skills that seem to be declining.

Is assessment for all PLOs in your division/area up to date?

7 Responses



8 Responses

Name of
Program,
Discipline,
Area or
Service

If you selected 'No' above, please explain why and include when you will complete the updated PLO assessment.

Astronomy

No. Astronomy is not a program, nor part of a program. But perhaps we should think globally about non-STEM major students wanting to earn an AA/AS or seek transfer to UC/CSU who need a physical science course, for which Astro would qualify (along with Geography). That would be a holistic "program" view, and force us to look at whether we are offering the right number of classes - at the right times and days - to allow students the chance to complete a transfer degree. Just a thought....

Chemistry

N/A

Computer
Science

N/A

Engineerin
g

N/A

Life
Sciences

N/A

Math

N/A

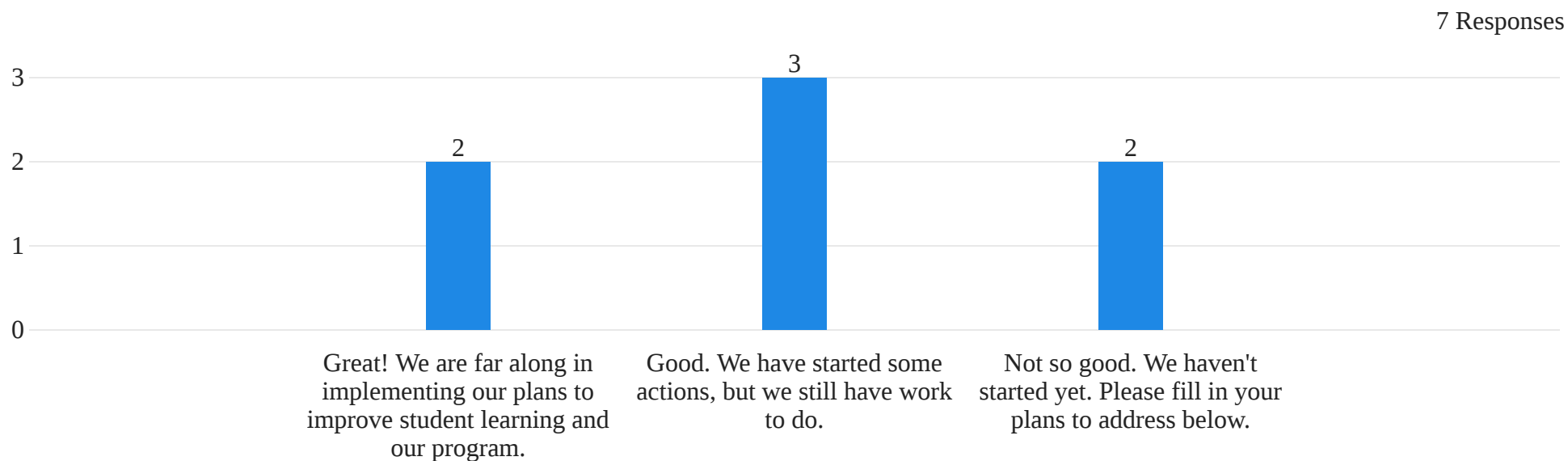
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STEM

N/A

Physics

The Physics AS-T degree is relatively new, and COVID has delayed our ability to work on the program. We will complete a review in Physics 4C (the third class in the degree program) in Spring 2023.

Please check one of the following boxes to describe how your discipline is doing regarding plans/actions for improving student learning based on SLO/PLO assessment data.



8 Responses

Name of Program, Discipline, Area or Service

If you selected 'Not so good. We haven't started yet' above, please fill in your plans to address below.

Astronomy We haven't made much headway at all with SLO assessment data. We did reviews of Astro 30 in the past two years, but more recent reviews of Astro 10 or 20 aren't available. COVID definitely derailed our efforts to create a unified approach in our classes, and we haven't had time to work on shared lesson plans. We will try to reach out to our team this year to identify new SLOs, and shared assessments, to renew our efforts

Chemistry N/A

Computer
Science N/A

Engineerin
g N/A

Life
Sciences N/A

Math N/A

MESA
TRIO
STEM N/A

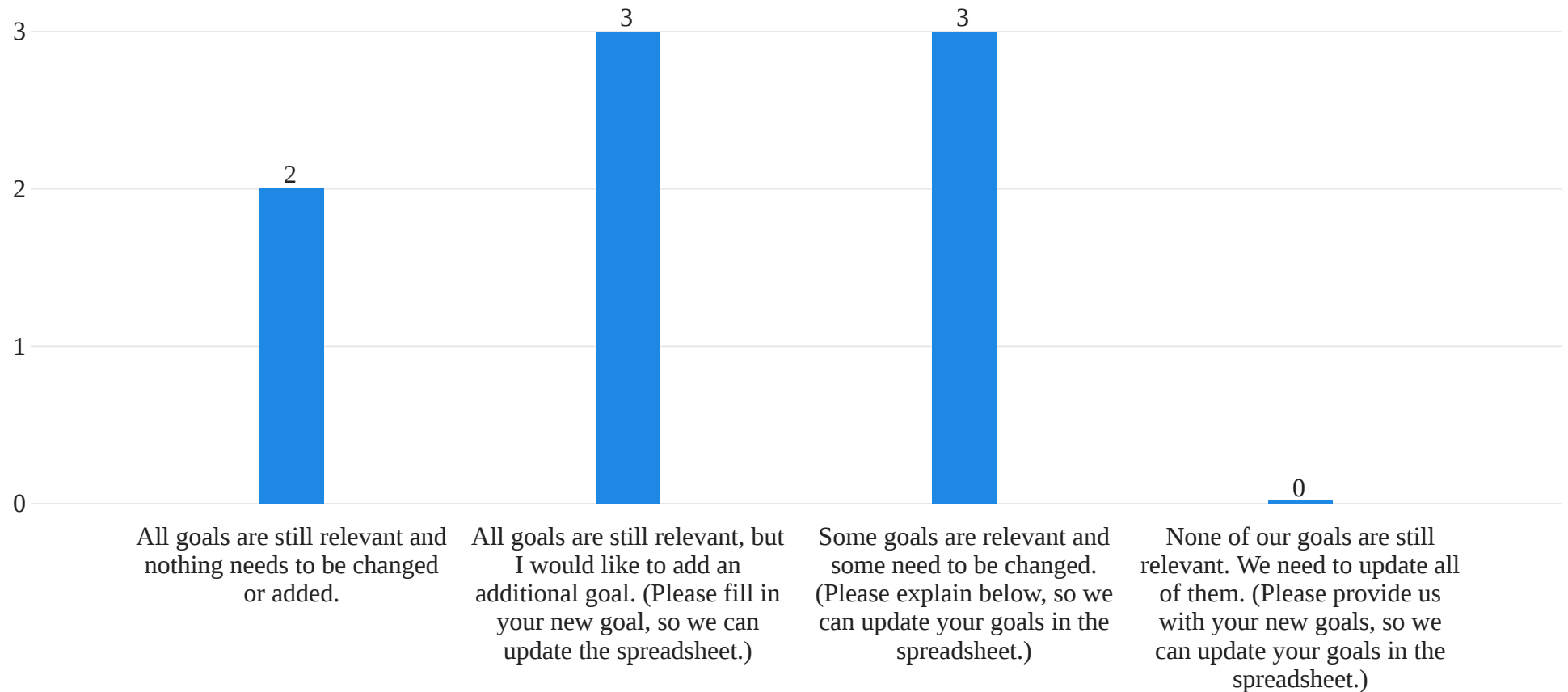
This comment below really is for "Good - We have started some actions, but we still have work to do." But this Qualtrics form doesn't allow for input for that choice. It should.

Physics We want to update all of the SLOs for the planned sequence 7ABCD, matching where applicable those SLOs from LPC to allow us to compare the programs. One of our goals for the change is to allow students at either college to complete the series at either school, and possibly allow for the final class (Physics 1D/7D) to be offered in alternating years at each school. We'll need to look at the SLOs for Physics 18 as well in light of these planned changes. And we'll want to revisit student success in Physics 11 and Physics 3A/3B.

Reflections on Goals & Future Planning

Status of Goals Established in Fall 2021 Program and Area Review

8 Responses



8 Responses

Name of Program, Discipline, Area or Service	All goals are still relevant, but I would like to add an additional goal [fill in].
Astronomy	Goal 4: Create an online Astronomy 30 course offering to increase opportunities for students needing 1-unit of laboratory science credit for transfer.
Chemistry	Better understand course-by-course and section-by-section variation in success rates.
Computer Science	N/A
Engineering	N/A
Life Sciences	New goals : Improve how to onboard new adjuncts and support them through teaching. (E.G. Create a new adjunct faculty guide for Biology using prior guides, identify new sections to add, integrate the syllabus best practices page from biology, and improve lab support and institute regular check-ins with lead faculty.)
Math	N/A
MESA TRIO STEM	N/A
Physics	N/A

8 Responses

Name of Program, Discipline, Area or Service	Some goals are relevant and some need to be changed. (Please explain below, so we can update your goals in the spreadsheet.)
Astronomy	N/A
Chemistry	N/A
Computer Science	Goals 1 and 3 still relevant with no changes. For Goal 2 we want to add that in order to grow and even maintain our program, we will need to address critical staffing issues, as two or our three full-time faculty members retired recently
Engineering	N/A
Life Sciences	N/A

Math

We've completed Goal 1 to redesign the BSTEM sequence. If all the articulation agreements go through, we will begin in the 2023-24 AY. For Goal 2, we've offered noncredit support for MTH 43 and 47 in the form of comingled MTH 220 workshops, but they are very lowly enrolled. We have not address Goal 3 directly regarding students who have not completed Algebra 2, though we've doubled instructional hours from 3 to 6 hours in Fa22 & Sp23 for College Algebra and Trigonometry courses by offering MTH 31S and MTH 36S. For Goal 4, more faculty have adopted OER. We have faculty OER pilots for MTH 1 and 8 during 2022-23 and will have MTH 2 pilot in Sp23. Now that AB 1705 has passed, we will need to research to clarify the scope of the law and continue to think about how to support students.

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N/A

We need to replace the completed Goal #1 with:

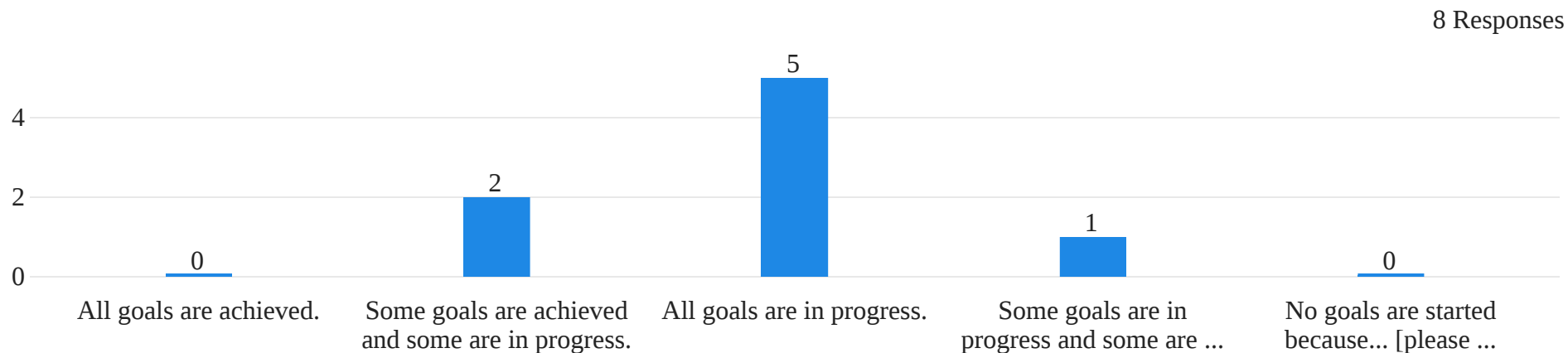
==> New Goal #1: Revising curriculum for Physics

Physic

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We plan to amend Physics 18 (changing from 3 to 2 units, and focusing upon both mathematical and college study skills needed for future success in the ensuing majors classes. We are also planning to change the Physics 4ABC/5 sequence to match LPC's by finalizing a new version of the series 7ABCD, which will reorder the concept presented to better match with our Math 1-2-3-4 courses, and add a lab to the final course.

Status of Your Program's/Area's Goals



Trends in Accomplishments and Challenges in Reaching Goals

8 Responses

Name of Program,
Discipline, Area or
Service

Question: So far, what is going well and what are some challenges regarding completing your program's/area's goals? You could include reflections on: achievement of outputs or outcomes and/or challenges with producing outputs or outcomes so far.

Going well:

- 1) We are able to use the planetarium for tours, special visitors, community events, recruiting, and more, continuing to prove its value to the campus and college. It is a challenging facility to maintain, but offers Chabot something that few other local colleges can match.
- 2) We finally hired a new full-time faculty colleague, Shannon Lee to help restore the program, after two years without Tim Dave. We've had creative adjunct faculty leading online sections during COVID.
- 3) We will continue to look for opportunities to support increasing attention about diversity in science. We did run planetarium programs in Summer 2022 for the public promoting diversity, especially for Latinx audiences.

Challenges Ahead:

- Astronomy
- 1) We may be losing the observation platform atop the new Building 2100 STEM Faculty Office/Lab Building, because of budget issues. We are working with the Bond Construction team to identify alternative locations including the expected STEM plaza if/when Building 2000 is removed. We need to stay active in the planning process and advocate strongly for some sort of observation area free of lights. Our current on-campus lab program is negatively impacted with current construction and lighting.
 - 2) On-campus enrollment is down significantly this year. Whether this will pass as COVID fears recede, or we will continue to experience low demand for on-campus courses, is a concern.
 - 3) We are seeing fewer students in Astro 10 and 20 who have the college study skills required to do the work we expect for a transferable class. We could make English 1A a pre- or co-requisite, but that will affect enrollment.
 - 4) We will try to add Astro 45 for Spring 2023, but enrollment for that still relatively new section may still be a problem. How can we do an even more effective job of promoting open classes, and finding times when more students might be interested to take the class, are key issues to address. We will hold a brainstorming meeting to explore and identify options, once we see how enrollment goes for Spring.

For Chemistry's goals, we have had some qualified success in increasing student success. However, this increased success came in the Spring of 2022, when we returned to in-person instruction for almost all of our courses. Considering that students enrolled in the in-person courses might be self-selecting, we are reluctant to call this increase a trend. Also, we kept our class size at the stated capacity, so our course sections were smaller—this may also contribute to student success.

Chemistry Another area that has seen moderate success is the piloting of instructional methods for increasing equity in chemistry classes. In particular, Dr. Pitcher started using standards-based grading in Spring 2022 with the result of no students dropping and all students passing his sections of Chem 1A and Chem 1B. This piloting is continuing this semester in his two sections of Chem 12A. More analysis is needed to see if this is a trend that will persist.

One area where we face challenges is in our enrollment. Our enrollments are down, except for Chem 10, which could run a third section if we had faculty to teach it. Again, the return to in-person instruction may explain this downward trend in enrollment.

Computer Science For Goal 1, we have made some progress by cross-listing Math 8 as CSCI 29. That way computer science faculty will be able to teach the course and gain tighter integration with CSCI 20.

For Goal 2, as mentioned earlier, to maintain a healthy program, we will need to address a critical staffing shortage due to recent retirements. We are currently down to just one full-time faculty member. Without new full-time hires, it will be difficult to staff existing courses going forward and impossible to grow the program.

Goal 1 Outputs: Articulation agreements have been made with several high schools and summer bridge courses are offered and taken by HUSD students. Outreach to high school to advertise programs, summer bridge, and high school articulated courses will begin in Fall 2022.

Goal 1 Outcomes: Engineering has decreased enrollment along with many other disciplines at Chabot. Our race/ethnicity is approaching the overall campus makeup, however, we will need to increase the number of black students entering the engineering program. Women entering the engineering field has decreased.

Goal 1 Challenges: Covid stopped articulation and coordination with high schools. We are working to establish relationships again including outreach, advertising of summer bridge, and articulation with high schools. ENGR 11 articulation agreements were also stopped due to covid, where we will need to have a design competition at the end of spring semester. Summer bridge will also need to be expanded.

Engineering
Goal 2 Outputs: Implemented a work based learning program in Fall 2022 that includes guest speakers, job shadowing, field trips, and University tours.

Goal 2 Outcomes: No outcomes will be available until next year

Goal 2 Challenges: Current work based learning is funded through HSI STEM grant. Need to determine how to insert these activities in current courses, update STEM 1 course to include activities, or create a credit/noncredit course to continue these activities in the future.

Goal 3 Outputs: We have made curriculum changes to engineering courses to maintain articulation with UC's and CSU's. Still need to continue to monitor curriculum and required engineering courses for transfer.

Goal 3 Outcomes: Still need data showing number of schools articulating each course

Goal 3 Challenges: UC's and CSU's are constantly changing course requirements for engineering majors.

Life Sciences

In reviewing the data, it is difficult to trust the trends in a way that does not take into account the role of Covid-19 in triggering changes in success rates. The effect of Extraordinary Withdrawal on students electing to take withdrawal verses persisting in courses likely contributed to lower success rates. One focus area would be that we are trying to focus on skill development and also to recover from learning loss that happened during covid. With students having less foundational understanding it has become difficult to expand their learning into the new concepts. Both conceptual and practical skill loss has affected learning. Social skills are notably compromised after Covid-19 with students less willing to engage with both other students and instructors. In lecture only classes, it can be extremely difficult to trigger student participation.

MES

A We are making progress in our goals with no issues. We are recovering from a decline in student participation and engagement during the pandemic and so this year is an upward trend in students joining the program and achieving our metrics.

TRIO

STEM

We were successful in completing Goal #1 (Hire Full-time Instructor for Physics & Astronomy We will find, hire, and start the next PAR cycle with a tenure-track colleague to help support our STEM students, improve our curriculum, and advance our program) with the hiring of Shannon Lee, and made very good progress in the past two years with Goal #3. We are in progress with Goal 2 (Hire Classified Professional (at least ½ time) to serve as laboratory technician supporting Physics, Engineering, and Astronomy labs. We will have labs that are even more successful, with equipment that works, improved access to demonstration equipment for lectures, and more time from faculty to improve curriculum and support students.)

Physic

s We also need to look at the Physics AS-T degree program PLOs, and decide how to better promote the degree, as well as assess its value.

We have made very good progress adding new equipment for our physics labs (Goal 3), and with the time and help of Shannon Lee and willing students, we have started re-organizing the lab. We now hope to hire a lab tech to start with Spring 2023 to help with our supplies and equipment (as well as with the Astro, Engineering, and Geology programs). Finding permanent funding for that classified professional position will be an ongoing requirement.

Rationales for Resource Requests

8 Responses

Program/Area Name

Which of your PAR goals, plans for improving student learning, and/or plans for reaching SAOs will need augmented or new resources?

Astronomy The lack of budget for the astronomy observation platform and telescope in the new STEM Lab/office building replacing 2100 means that we will need to address the issue with future facilities allocations. As building continues on campus, we have less open space and less dark space to run an effective evening lab program. While we want to add an online component to help our students reach their graduation and transfer goals, that isn't the best solution for many students, and isn't the only solution we should offer.

Chemistry One of our PAR goals is "Integration of lab curriculum for different courses." In accordance, most of our requests are in the area of improving laboratory instruction.

Computer Science

N/A

Engineering We will need full time personnel to continue to help coordinate and implement our work based learning, summer bridge, and articulation between high schools and universities.

Life Sciences Regarding our goal - "Establish faculty inquiry groups for the process of improving teaching across the discipline." - we are still seeking resources to hold a retreat for the purposes of developing a comprehensive internal discipline program map. This would involve identifying needed skill progression and clear alignment of expectations from students in preliminary classes to the higher level classes. We need time for all faculty to do a programmatic review map for skill development and benchmark assessments. This will hopefully create a better hold of needed skills from introductory courses until the capstone course.

Math I recently found out that College of San Mateo had multiple full department trainings on co-requisite, and now they have regular community of practice meeting to discuss this or anything else related to teaching math. After I find out more, we may need funding to pay for similar training and PT faculty to attendance. There is a drop in success rate in MTH 36/37* in the past AY 2021-22 as we get HS school graduates who finished their senior in the pandemic.

* <https://docs.google.com/spreadsheets/d/1u8u5o2EbA1PbMRlwrkeyydDPjlZwh9OEiDvq5jN4z-w/edit?usp=sharing>

MESA TRIO STEM

none

Physics We don't see the curriculum changes as requiring more resources, and we are continuing to update the lab equipment with current funds.
 s We do need a long-term funding commitment for the lab tech position.

Service and Instruction Mode of Delivery (Optional Question)

8 Responses

Program/Area Name	As Chabot evolves our operating procedures in response to the Covid-19-pandemic: what does your program/area believe is important to keep in mind regarding online vs. hybrid vs. face-to-face instruction, service delivery, and working environments?
Astronomy	We need to offer balance. Not all students are prepared for online learning, even if they might prefer that mode of instruction because of its convenience. We found during COVID that hybrid instruction – mixing reduced on-campus meetings with online work – didn't fare well for most students in the introductory classes.
Chemistry	The need for flexibility is of great importance. This includes having different teaching modalities available for appropriate classes, as well as maintaining day-to-day flexibility within classes. If students or instructors miss class due to COVID (or other illness), having some kind of schedule flexibility (e.g. lab schedule) or contingencies in place would be helpful.
Computer Science	Most lab-based Computer Science classes are best offered in a hybrid format with lectures online and labs on campus. During labs, student benefit from face-to-face interaction with the instructor and other students. Online lectures can watched to suit the student's schedule and learning pace. In fact, success rates for hybrid format sections exceed that of face-to-face sections of the same courses. Data on face-to-face vs. Online for Fall 2017, Spring 2018, and Fall 2019 in CSCI 8 and CSCI 14 courses, show success rate is higher for online; both non-success and withdrawal rates are lower for online sections when compared to the face-to-face campus sections.

Engineering	<p>Before the pandemic, engineering faculty had difficulty scheduling classes, attending meetings, and working with students due to the number of different courses we must teach and the need to avoid other STEM courses so students can transfer. With decreasing FTES, hybrid/hyflex modality is the best way to capture as many students into our program. Students are working while taking classes and hybrid gives them time to work and take classes on their own schedule. Due to these challenges facing our students and program, engineering is moving toward the hybrid model for all of its courses. This allows us to schedule labs in person without overlapping with other courses that students will need to take in the same semester. Although the switch to online was difficult for many, engineering was still able to offer in person labs from Fall 2020. Thus we have had two years to find a balance between synchronous/asynchronous lectures and in person labs. In Fall 2019, our success rates were at 63% and in Spring 2022 our success rates were 64% when we switched to the hybrid model. We will continue to monitor success rates to determine which modality will be best for students.</p> <p>As classes continue to be offered online, Chabot also needs to offer hyflex modalities for events, meetings, etc. On campus meetings are not always viable for all faculty needing to attend due to variations in schedule.</p>
Life Sciences	<p>Our labs should always be in person to meet transfer requirements. Offering a variety of lecture formats , if supported by equivalent outcomes, should be supported. Better services for helping faculty develop online courses should be explored. We should definitely establish standards for teaching regardless of modality.</p>
Math	<p>In Math (and also science classes where prereq skills are extremely important), the anecdotal evidence suggests that the lack of proctored assessment over the pandemic has had a negative impact for learning. The college needs to consider a testing center or similar arrangement if it wishes to support various forms of distance education in Math and Science.</p>
MES A TRIO STEM	<p>We need to continue to provide multiple modalities across all service delivery.</p>
Physics	<p>N/A</p>