

2023-24 Program Review

Program Name: Mathematics
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Academic Year: 2023-2024
Status:
Updated on:

INTRODUCTION: WHAT IS PROGRAM REVIEW FOR?

The goal of program review is to assess how well our programs are doing. Program review asks us to:

- Reflect on the state of student learning or support in our disciplines and programs, by discussing:
 - efforts to achieve equity across student populations and modes of delivery;
 - results of assessment activities aimed at improving or researching student learning;
 - new challenges or changes to the program.
- Identify resources that we need to change and improve.

Though program review is tied to accreditation, ultimately, we want program review to be meaningful for us. This means we want to use program review to highlight and celebrate what is working, identify what isn't and to figure out what we can do about it. Program review also provides an opportunity to assess how those things work in practice, and work to improve our practices to be able to serve our students even better. It also serves to create cross-campus understanding and dialogue and make more informed decisions in our teaching and programs. Program review is also an opportunity to advocate for change and for resources by showing need and equity issues that we need additional support to be able to address.

1. Description of Program (200-400 words)

- Provide a brief description of the program and how it supports the following:
 - [CSM Mission and Values Statements](#)
 - [CSM Statement of Solidarity](#)
 - [CSM's Strategic Priorities](#)
 - [SMCCCD's Strategic Goals](#)
 - [CSM Forward 2028 - Education Master Plan](#)
- Identify any factors, including federal, state, or local initiatives, that have impacted the program and the students serve.

The Math Department is committed to the equitable treatment of all students, faculty, and staff. Many Math faculty have included group participation and embedded tutors into their curriculum as part of the active learning process. Math faculty attend conferences and institutes on AB705 and AB1705, racial equity in teaching mathematics, online instruction and learning, alternative grading, building thinking classroom, and others. The Math Department encourages participation in the many learning communities and programs at CSM such as MeTaS (to increase the number of STEM students in the Latinx community), Umoja (a community targeting African American students), Puente (for students in under-represented groups who are planning to transfer to a 4 year college), EOPS (for students with academic and socioeconomic barriers) Promise Scholars, Athletics and more. We have been

collaborating with several of these programs and communities by offering Math classes that are cohort restricted to one of these groups and working closely with staff from the program. The Math Department continues to have Supplemental Instruction/Embedded tutoring and the Math Resource Center. Legislation now requires we no longer offer several lower level math courses, such as Pre-Algebra, Beginning Algebra, and Intermediate Algebra. This has had a huge impact on the Mathematics department and the students we serve.

2. Results of Previous Program Review (200-500 words)

a) Describe the results of your previous Program Review's action plan and identified equity gaps.

- Previous Goals
- Results Achieved
- Changes Implemented
- Plans still in progress
- Any notable or surprising results and outcomes

Our goals from our last Program Review involved working with different CSM programs to provided extra support for students in athletics (Math in the End Zone), EOPS, Promise Scholars, and International students. The Math department offered cohorts of these programs for several math courses and worked closely with coaches (for athletics), counselors and retention specialists from each program. Through this collaboration and sense of community we saw higher enrollment, higher retention and higher success rates. Due to the successes we saw, we will continue to offer these cohorts and work together with other communities as well. The Math department also collaborated with STEM@CSM and offered several Academic Excellence Workshops (Algebra, Statistics, Pre-Calculus and Calculus). Many students participated in ongoing workshops. Several students who were not passing improved due to these workshops and passed their math course.

b) Explain any curriculum or programmatic changes since last program review

- To specific courses, or to any discipline as a whole
- Includes degree, certificate, or course sequences, program delivery or structure, etc.

As a result of AB705, we eliminated all classes below and including Math 120 (Intermediate Algebra). We have been able to include Supplemental Instructors and Embedded Tutors for many of our classes. Many instructors are including group work in their classes, as well as “non-math” topics including study skills and writing exercises.

c) Discipline-level and SLO (Student Learning Outcomes) assessment/Student Services and SAO (Service Area Outcomes) assessment: Describe learning or area assessment plans implemented since last Program Review, including any activities undertaken to address equity or delivery mode gaps. Your summary should explain:

- SLO/SAO
 - What did the assessment focus on?

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- Was it discipline/program/service-specific or interdisciplinary/a collaboration between programs or services?
 - Why was it prioritized (e.g., equity issue, key disciplinary issue, etc.)?
 - Assessment results
 - What was the activity or intervention?
 - What were the outcomes?
 - Program improvements implemented
 - What did you learn from it?
 - What changed?
1. The Math Department conducted a qualitative investigation on how students and faculty perceive student success and ways of achieving it. A series of student and instructors' interviews were conducted in Fall 2021. 22 students, mostly from regular Math 200 and Math 200/800, and 22 math instructors (all of the full-time faculty and 96% of the part-time faculty) participated in open ended interviews on academic and soft skills' factors contributed to student success. The preliminary analysis showed the following common theme: According to both students and instructors, timely communication between students and instructors is the major key to success and retention. Further analysis of the collected data is currently in progress.
 2. In the Fall of 2022 several math instructors participated in a Science Faculty Institute, during which the following investigations were conducted in two Math 200/800 classes and one Math 225.

Math 200/800 #1: mastery equitable grading was incorporated through an implementation of Canvas peer-instruction quizzes. Based on the survey results, the students found the intervention effective and enjoyable.

Math 200/800 #2: weekly short qualitative surveys with the instructor's feedback were incorporated. The results demonstrated the presence of effective learning community environment (more information can come).

Math 225: Incorporation of flipped classroom for exam's review was incorporated. In-class time was used for problem solving in groups.
 3. In Spring 2023 the Math department examined student paths in corequisite Math 241/841(25 students) and regular Math 241 (12 students). Based on the collected data:

Majors:

Course	Business Majors	Undecided majors	Computer science	Psychology	Accounting	Biochem	Digital Media
Math 241/841	72% (with 2 students in business/economics)			12% (3)	8% (2)	4% (1)	4% (1)
Math 241	67%	25%	8% (1)				

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Previous math courses: summarized in the table below

In **Math 241/841**, 1 student (4%) took pre-calculus in HS, 2 (8%) took Math 225 at CSM, 4% (1 student) took trigonometry at CCSF, 4% (1 student) took Math 130/830 at CSM, 28% took Math 200/800 at CSM, 4% took Math 200/800 at Canada, 4% took Math 200/800 at Skyline, 24% took regular Math 200 at CSM, 8% took regular Math 200 at Skyline, 4% took Math 145 at CSM and Algebra 2 at HS, 4% took Algebra 2 in HS.

In **Math 241**: 25% (3 students) took Math 200 at CSM, 8% (1 student) took Algebra 2 and Stats in HS, 8% (1 student) took Calculus in home country, 8% (1 student) took Math 200, 33% took Math 225, 16% (2 students) took Math 200/800 at CSM.

Course	HS Alg 2	HS Precalc	College Precalc	College Trig	Math 200 from SMCCD	Math 200/800 from SMCCD	Math 145 at CSM and Alg 2 in HS	HS Alg 2 and Stats	Calc not in US
Math 241/841	4% (1)	4% (1)	8% (2)	8% (2)	32%	36%	4% (1)		
Math 241			34%		34%	17% (2)		8% (1)	8% (1)

Future Math course:

Current Course	Math 242	Math 200	Math 251	Last Math class	unknown	
Math 241/841	4% (1)		8% (2)	8% (2)	80%	
Math 241		17% (2)		34% (4)	49%	

4. **Spring 2023:** A collaborative math inquiry project was conducted in our corequisite Path to Calculus Math 225/825. A collaborative project involved math faculty (Jay Lehmann), two embedded tutors (Emily and Ted), Retention Specialist (Cheyenne), MESA director (Olivia), PRIE (Heeju), with a lot of input from the math department Community of Practice focused on the impact of a retention specialist on student engagement and success. The inquiry focused on the following research questions:

- 1) What impact does the implementation of a collaborative, proactive, and personalized support model have on students' attitudes and performance in math 225/825?
- 2) In what ways did it affect student attitude and performance in the math course 225/825?

Method:

- N=31, math 225/825 in Spring 2023
- Data:
 - Course grades
 - Survey data (n=19)

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- Focus group data (n=18)
- Instructor's weekly log
- Learning support center (MRC and ISC) attendance data
- Mixed method: A triangulation approach, combining multiple data sources, to achieve a comprehensive understanding of the classroom environment and student behaviors

Results:

RQ1, Students expressed a shift in their attitudes, increased confidence, motivation, and a heightened sense of accountability as learners.

- Students felt more confident in developing better learning strategies that work for them (73%).
- Students felt more comfortable reaching out for support (68%).
- Students felt greater confidence in their ability to do math (63%).
- Students felt more motivated to do better in school (58%).

RQ2: Students feeling supported in multiple ways can significantly contribute to their attitude and performance. Various components play a crucial role in fostering this support, each influencing students in distinct yet interconnected ways:

- Instructor engagement
- Regular assessments and feedback
- Peer collaboration through active/group learning
- Tutoring services embedded and connected with instruction
- Administrative support

3. Current Program Review (200-400 words)

Please use the statistics below, which are college-wide, as a reference. Please refer to the Program Review website for individual program data.

College Stats 2022-23	Ethnicity	First Gen	Age	Gender	Total
Headcount (unduplicated)	Latinx 32% White 26% Asian 20% Filipino 7% Multiracial 7% Black 3% Pacific Islander 2% Unknown 3% Native American 0%	45% of our students are the first in their family to go to college.	66% 24 yrs. and under 18% Ages 25-34 17% over 35 yrs.	49% Female 48% Male 3% Non-disclosed or non-binary	13,180 students
Enrollments (duplicated)	Latinx 35% White 26% Asian 16% Filipino 6% Multiracial 8% Black 3% Pacific Islander 3% Unknown 3% Native American 0%	47% of enrollments were by students who are the first in their family to go to college.	76% 24 yrs. and under 13% Ages 25-34 11% over 35 yrs.	48% Female 50% Male 2% Non-disclosed or non-binary	37,014 enrollments

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a) **Student population equity:** Discuss any gaps in student success, persistence, satisfaction, utilization or enrollment across student populations (statistics provided for ethnicity, first-generation, age, gender and total enrollment), or student population served.

- Findings: What has changed from the previous program review?
- Analysis: What factors do you feel contribute to these gaps?
- Resources: If you were granted a resource request, please note what that was and the impact it had.
- Plans to address opportunity gaps: What has your program done to address these gaps? Include information on:
 - interventions implemented
 - any successes in closing gaps
 - ongoing challenges

Findings	Analysis	Resources	Plans to Address Opportunity Gaps
1. There is a slight improvement in the percentage of females enrolled in math courses. But there is still about a 12% difference between male and female math students.	Persistent societal stereotyping that girls/women can't do math		women in STEM CSM student club. STEM @ CSM MeSa.
2. The success rates for all students in Math courses has steadily decreased over the past 3 years by as much as 10% per year and the retention rate has also decreased by about 9% each year. Overall success rate from 2022/23 is 62.6%.	The biggest contributing factor we see is the loss of the lower math courses here at CSM.	CoP – sharing of best practices Embedded tutors – peers that share their experiences, build camaraderie, give students individual care.	Groupwork Individualized student care We are offering weekly Academic Excellence Workshops in Pre-Calculus and Calculus
3. A continued gap in success rates persists for the ethnic group Hispanic - 53.9% for 2022/23 and for Pac Island 37.3%		CoP – sharing of best practices Embedded tutors – peers that share their experiences, build camaraderie, give students individual care.	Continue to collaborate with programs (EOPS, Promise, Athletes, International, STEM@CSM, MESA) as before. In addition we have added a cohort for the Puente program Fall 2023.

b) **Modes of Delivery equity:** Discuss any gaps in student success, persistence, satisfaction, utilization or enrollment, and student population served across different delivery modes.

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Please comment on in person services/instruction vs hybrid services options/instruction vs completely online services/instruction.

- Changes since last Program Review: What has changed, in terms of gaps, since last program review?
- Analysis of gaps: What factors do you feel contribute to these gaps?
- Plans to address opportunity gaps: What has your program done to address these equity gaps? Include information on:
 - interventions implemented
 - any successes in closing gaps
 - ongoing challenges

Changes since last Program Review	Analysis of Gaps	Plans to Address Opportunity Gaps
1. Fall 2021-Present: More diverse offerings of online modalities (online async, online sync, and hybrid).	Many students are juggling many challenges including family care, health concerns, and employment.	We are offering more hybrid and online courses than before the pandemic.
2. Summer 2022, Spring 2023, Summer 2023, faculty completed QILT 2.	Several our faculty completed their previous DE training more than 3 years ago. A periodic training is needed to stay abreast of constantly changing technology.	We aim providing high quality online offerings of math classes in different modalities to accommodate diverse needs of our students.
3.		

(c) **Challenges and Opportunities:** Describe any **other** particular challenges, opportunities, or other factors that impact the success of your program (e.g., natural or health disasters, assessing whether a degree program is meeting its learning outcomes, developing new degree programs or courses, adapting to a changing student population, keeping a flagging program alive, starting a learning community, resources, etc.).

One of the biggest challenges that we are facing as a math department is the number of students enrolled in a math course who do not have the mathematical background necessary for that course. This became a big problem for most math courses we offer. With the loss of our lowest level courses we are finding it very challenging to help students fill the knowledge gaps. With 1705 implementation, our STEM program may be in danger due to many student's inability to pass the first calculus course Math 251. We are now offering corequisite courses (support courses) to help with this issue. Due to the nature of the population of students in support classes and best effective practices with learning and development of study skills, our instructors target to focus on individual work with each student. Such equitable approach brings the most positive results, with the class of 35 students such approach is not possible to use. A class cap of 25

students in support classes would create an environment where we could provide specialized intervention for each student.

In addition, most of the current classrooms that the math department uses are not equipped for group work. There is one such room (18-204) and the demand for that classroom is too high to accommodate even ¼ of our face-to-face classes. And so, we need more classrooms updated with space to have movable desks and chairs.

With enrollment increasing we are also finding it difficult to staff our classes. For Fall 2023 we have many classes that are overcrowded. Faculty had to turn away students from enrolling in their class because there wasn't physical space for the students in the classroom. Some faculty went above and beyond by changing rooms to accommodate more students. With the retirements the math department has had and enrollment being up, it is clear that we need to hire at least two more full time faculty.

4. Planning

a) **Discipline-level and SLO (Student Learning Outcomes) assessment/Student Services and SAO (Service Area Outcomes) assessment for 2023-2025:** Describe learning or area assessment plans for this Program Review cycle, **including any activities planned to address equity or delivery mode gaps.** Your summary should explain:

- SLO/SAO
 - What will your assessment focus on?
 - Is it discipline/program/service-specific or will it be interdisciplinary/a collaboration between programs or services?
 - Why is it prioritized (e.g., equity issue, key disciplinary issue, etc.)?
- Assessment plan
 - What is the planned activity or intervention?
 - Describe next steps and the timeline for your SLO/SAO assessment
- Resources for SLO/SAO assessment
 - What resources will you need to assess changes (i.e., PRIE support in the form of specific data, surveys, etc.)?

SLOs/SAOs	Assessment Plan	Resources for SLO/SAO assessment
1. Student paths, success and retention in Math 251 (related AB 1705)	Survey Math 251 students on their demographics and previous math courses, collect data on retention and passing rate.	Create survey, collaborate with all Math 251 on data collection
2. Student paths, success and retention in Math 225	Survey Math 225 students on their demographics and previous math courses, collect data on retention and passing rate.	Create survey, collaborate with all Math 225 on data collection

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3. Keep collecting data on Student paths, success and retention in Math 200/800 and Math 200	Survey Math 200 and 200/800 students on their demographics and previous math courses, collect data on retention and passing rate.	Create survey, collaborate with all Math 200 & 200/800 on data collection
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b) Program goals

Based on your current review of your program’s equity gaps, learning assessments and challenges and opportunities, identify specific goals and plans. Please note that whereas SLOs/SAOs involve assessing and measuring a specific skill or knowledge students will be able to do/understand upon successful completion of a course, program, service, and/or degree/certificate, program goals reflect overall aspects of your program or service you hope to improve.

Please note that closing equity gaps is a College-wide priority. If there are significant equity gaps in student success, persistence, satisfaction, utilization or enrollment, and student population served in your program, these should be addressed in at least one of your goals (see 3a and 3b).

For each goal, you should include:

- A brief description of the issue being addressed (equity gap, etc.)
- What actions you plan to take
- What measurable outcomes you hope to achieve
- A timeline
- Who is responsible
- What support do you anticipate needing in order to achieve your goals and plans, including:
 - Professional development activities
 - Institutional support
 - Collaborations
 - Training
 - Resources

Goal	Actions	Measurable Outcomes	Timeline	Responsible Party	Support Needed
1. Address weak math skills.	Math Bootcamp – faculty led, self-paced through a Canvas site with many math materials	Retention / success of all students who are under prepared for their current math course.	Present to foreseeable future	Yvette Butterworth / Michelle Beatty	Release time for faculty to work with individual students.

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2. In response to 1705 implementation build support for Math 251 students	Identify paths through which students are getting into Math 251. Examine major difficulties. Create a support to address these difficulties. (Considering Developing and offering a corequisite section of Math 251.)	Retention / success of all students who are under prepared for their Math 251 course.	Spring 2024 or Fall 2024 to foreseeable future	Lena Feinman and other faculty who teach Math 251.	Classrooms that allow for groupwork, class sizes that allow for individual attention, more full-time faculty, at least one embedded tutor in each Math 251 section, community of practice to share best practices, more Academic Excellence Workshops. Funding is needed to implement all of the above
3. Improve open source materials for our stats courses	Build team of instructors who can collaborate on the revision	Retention / success of Math 200 students using these materials	Spring 2024 to foreseeable future	Lena Feinman/Math 200 team of instructors	Release time/funding for faculty working on the revision.

5. CE Only

- a) Review the program's available labor market data, as applicable, and explain how the program meets a documented labor market demand. Here are two relevant links:
 - [State of California Employment Development Department, Labor Market Information Division](#) (the official source for California Labor Market Information):
 - [Employment data](#) (by Program Top Code) from the State Chancellor's Office
- b) Summarize student outcomes in terms of degrees and certificates. Identify areas of accomplishments and areas of concern.
- c) Review and update the program's Advisory Committee information. Provide the date of most recent advisory committee meeting and outcomes of the meeting (updates, changes, new members, etc.).
- d) What strategies have you discussed in your recent Advisory Committee's meetings to meet the needs and challenges of getting people retrained and back to work?