



OUTCOMES & ASSESSMENT

General Education Learning Outcome (GELO) Assessment

Math Graduation Requirement

Course Completion and SLO Data Fall 2018 - Spring 2021

Assessment Report, Spring 2023

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Executive Summary

- The following [slideshow](#) summarizes the key findings in this report
- Overall, 11,821 assessments of SLOs mapped to the Math Requirement were completed over six semesters, with a proficiency of 72.3% “meets SLO”.

- Proficiency was higher during the three pandemic semesters (spring 2020-spring 2021) compared to the pre-pandemic semesters (fall 2018-fall 2019).
- The percentage of students meeting the SLOs in this three-year period was also higher than that reported in the prior assessment in [2017](#) (66%).
- Opportunity gaps for equity populations and for younger students persisted through this period. Students under 25 and especially those under 19 achieved the SLOs at a rate approximately 3% below the average of all students, and as much as 16% lower than the highest proficiency age group. An 11% difference was identified between students in equity populations and those not in equity populations, in attaining math proficiency, which translates to an equity gap of 6% (the gap between the SLO proficiency of equity populations and the average of all students). A significant opportunity gap was also identified for Black/African American and Pacific Islander/Native Hawaiian students, with these groups meeting the SLO at a rate more than 12% lower than the average of all students.
- We identified an interaction between age and equity groups in SLO attainment, with the largest gaps showing up for young students in equity populations (see Table 11). This points to the urgency of teaching and learning strategies to improve SLO proficiency designed with younger students from equity populations in mind.
- During the report period, substantial changes occurred in math placement and in the math sequence of courses, reflecting larger trends toward acceleration, co-instruction (e.g., Math 80 paired with Math 80S), and students' self-placement and/or placement based on high school grades.

Introduction

This report presents the findings of the third assessment of the Math Graduation Requirement, which was previously reported alongside GE Area C. This report is part of an ongoing effort, in accordance with the [CCSF Institutional Assessment Plan](#), to regularly assess teaching and learning in individual General Education Areas. These reports are intended, more specifically, to document aggregate student learning outcome proficiency and course completion data, identify equity concerns and opportunity gaps, and look more deeply at the outcomes and core concerns in the Area. The assessment process supports dialogue around teaching and assessment and helps to ensure the integrity of programs at CCSF.

The MATH GRADUATION REQUIREMENT GELO aligns to CSU Area B4 and IGETC Area 2; it reads as follows:

Upon completion of this coursework, a student will be able to:

Apply mathematical concepts through numerical, symbolic, graphical, and verbal methods to interpret quantitative information, solve problems, and communicate results.

Courses that meet the math requirement are offered by the Mathematics Department, Behavioral Sciences (Psychology), Social Sciences (Economics and Philosophy), Latin American and Latino/a/x Studies, Engineering and Technology, and Business (Finance).

This report includes quantitative and qualitative data sources. The Office of Research and Planning has provided quantitative data based on course completions and CRN-level SLO mastery levels for the Spring 2015 – Spring 2021 period. Summer semesters were excluded. The SLO Coordination Team discussed

these results with representatives from the departments offering courses to meet the math requirement during the Fall 2022 semester, and also with the SLO Committee of the Academic Senate, to supplement the numerical data with discussion, to round out the snapshot this report provides on the Area.

Meetings were held to gather responses to the SLO and course completion data with the following groupings:

- School of STEM meeting (Dean David Yee, department chairs)
- Meeting with representatives of departments offering courses that meet the Math Requirement (departments in attendance included Math, Behavioral Sciences, Social Sciences)
- SLO Committee
- A few ad hoc discussions with specific faculty

CCSF Courses that meet the CCSF, CSU and IGETC (UC) area requirements.

The list of CCSF courses that meet the CCSF Math Requirement can be viewed in the 2022-2023 [CCSF General Education Worksheet](#).

The list of CCSF courses that meet CSU B4 can be viewed in the 2022-2023 [CSU Transfer Worksheet](#).

The list of CCSF courses that meet IGETC Area 2 can be viewed in the 2022-2023 [IGETC Transfer Worksheet](#).

Follow-up on Recommendations in the 2017 Math/Area C GELO Report

In the 2017 GELO report on Area C and the Math Requirement, recommendations were made, and the college has acted on several of them in recent years. The recommendations and subsequent actions taken are summarized below:

- The 2017 report recommended “to continue (or add) tutoring, other support strategies/services, professional development, and the development of effective learning spaces in conjunction with the Office of Student Equity in order to address remaining achievement gaps” for what was then termed “underrepresented minority students.”
 - Tutoring, professional development, and other support strategies have been implemented, including embedded tutors in some Math Requirement courses.
 - Overall completion of transfer-level math has increased significantly, but the opportunity gaps remain.
 - Increasingly, the college has recognized that the opportunity gaps cannot be closed by tutoring or remediation alone, and the Student Equity Plan for 2022-2025 emphasizes race-conscious structural changes and instructional changes intended to close the gap.
- The 2017 report noted that “More needs to be done to improve student success for young students” and this continues to be the case. Some of the actions recommended in 2017 have been or are being implemented, including
 - Improved early alert system, which is still a work in progress.
 - Acceleration in the math, English, and ESL sequences, which has been achieved.
 - First-year experience and/or first-year learning communities, which have been implemented on a small scale through the Metro program and other learning communities at the college; planning is underway for their expansion.

- The 2017 data did not show an equity gap based on sex/gender (nor did we identify one in this report), but faculty in 2017 expressed concern about the drop-off of enrollment of non-male students in the upper levels of math and science. This point was raised again in discussions with faculty in this report.
- The 2017 report recommended revisiting the language of the Math Requirement; we did not pursue that in 2022-2023, though we did review if the introduction of the CalGETC transfer sequence would necessitate changes and we determined that it would not.
- The 2017 report put a lot of emphasis on fostering positive learning spaces and environments on campus; with the pandemic, efforts at creating physical environments were redirected toward improving virtual environments. The college is currently in a process of reinvigorating campus life, face-to-face, including multiple construction projects. Fostering positive spaces on campus for students to study, get help, interact, etc., should continue to be a priority in this process.
- The 2017 report noted that the GELO assessment could inform the process of creating alternative math pathways, such as the statistics pathway, in conjunction with changes at the CSU. The Math Department currently offers pathways for statistics (mostly oriented to the social sciences), for calculus (mostly oriented toward STEM), and for humanities majors.
- The 2017 report also emphasized the value to student success of proper sequencing of courses, with the use of prerequisites, corequisites and co-instructional courses to support student success. The college as a whole and, in particular, the Curriculum Committee have continued to work toward that end.

CCSF Math Graduation Requirement Outcome Mapping

Data considerations:

The mapping of outcomes from courses to GE areas is vetted during the curriculum approval process by the Curriculum Committee. While in the past, mappings were further vetted by the SLO Committee, the SLO Coordinators, and/or Chairs of the relevant departments, that step was not undertaken this year, as we rely on the Curriculum Committee and the cycle of continuous improvement to correct any inappropriate mappings over time.

The wording of the Math Graduation Requirement did not change over the period of this report.

The total number of assessments decreased in Spring 2020, the first semester of the covid-19 pandemic, as SLO reporting was made optional that semester to support faculty as they pivoted to remote instruction and coped with the direct and indirect effects of the pandemic. Course modality changed from primarily in-person (with some percent of online courses offered) up through March 2020 to all remote and online instruction for the remainder of Spring 2020. For most courses, remote and online instruction continued through the study period (through spring 2021). Some remote instruction was synchronous, usually over Zoom, and some was asynchronous.

The study period includes three semesters of data pre-pandemic and three semesters of data during the pandemic. The resulting data *may not be directly comparable* to prior semesters. Rather, these data provide a “snapshot in time” of student proficiency in Area C and the math requirement.

The data below are stratified by various demographic factors, to better identify opportunity gaps that could be addressed. There may be additional confounding factors, demographic or otherwise, that are not analyzed in the data presented.

It may bear repeating that SLO data cannot be used to directly compare or evaluate faculty, as different methods are used for assessing SLOs in different courses and often in different sections. The purpose of SLO assessment is to improve teaching and learning broadly, not to evaluate individual students or faculty members.

For detailed mappings across all GELOs and courses, see [Appendix 3](#).

Overall Outcome Assessment Results

- In this section, we present the total counts of assessments in the Math Requirement, as well as the breakdown of SLO assessment results.
- A brief analysis and summary of the comments from area faculty follow each set of tables and graphs.

Count of Assessments

Table 1. SLO count of assessments and outcomes in the Math Requirement, Pre-pandemic Semesters Fall 2018- Fall 2019

Term	Count of Assessments	Percentage met outcome
Fall 2018	1,779	65.4%
Spring 2019	2,243	69.1%
Fall 2019	2,497	69.4%

Table 2. SLO count of assessments and outcomes in the Math Requirement, Pandemic Semesters Fall 2018- Fall 2019

Term	Count of Assessments	Percentage met outcome
Spring 2020	467	80.3%
Fall 2020	2,505	76.4%
Spring 2021	2,330	77.9%

Discussion and commentary on the number of assessments

- Total assessments include 11,391 for the Math Requirement.

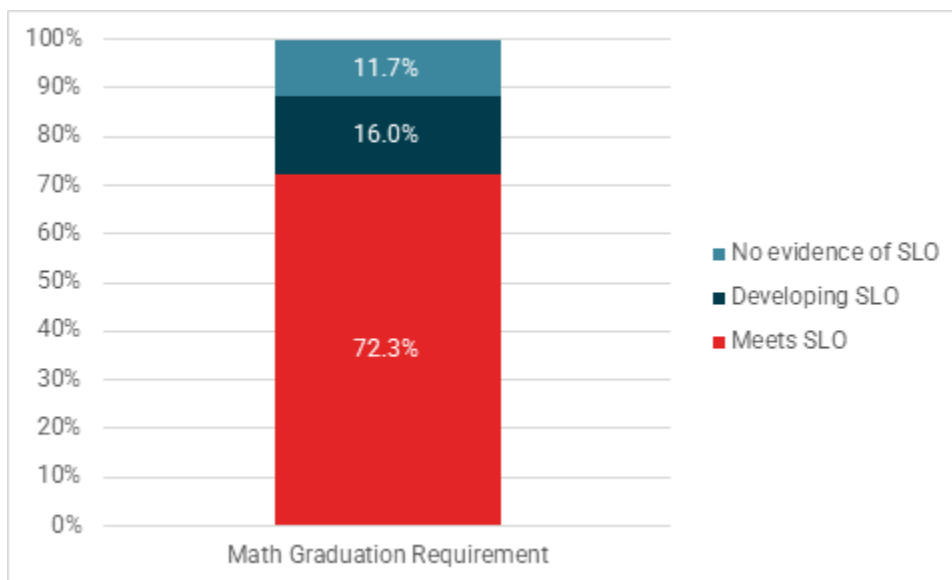
- As noted above, the count of assessments in Spring 2020 was lower due to the lifting of the requirement to file SLO reports for that semester. The number of assessments completed in the later pandemic semesters exceeded the pre-pandemic semesters.
- In the prior GELO assessment in 2017, 9,773 for the Math Requirement were reported, so the current report includes approximately 17% more assessments of the Math Requirement, despite overall enrollment at the college having declined.
- Discussion of the results of assessments follows the next set of tables and figures.

Results of Assessments (overall)

Table 3 Results of SLO assessments in Math Requirement, Fall 2018 - Spring 2021

Assessment level	Mets SLO	Developing SLO	No evidence of SLO	Total
Percent of assessments	72.3%	16.0%	11.7%	100%
Count of assessments	8,551	1890	1380	11,821

Figure 1. Percentage breakdown of SLO assessment results in Math Requirement, Fall 2018 - Spring 2021



Discussion and commentary on the overall results of assessments

- On average, in the Math Requirement courses, students demonstrated proficiency (met SLOs) at the rate of 72.3% overall, with another 16.0% developing the SLO.
- The percentage of students meeting SLOs varied considerably across the different semesters. In the Math Requirement, SLO proficiency increased in the pandemic semesters compared to the pre-pandemic semesters.
- The shifts in SLO proficiency (or SLO attainment) over the six semesters (see Table 1) are larger than we would expect to happen by chance. However, they are difficult to interpret. Average SLO attainment in the three semesters during the pandemic (Spring 2020-Spring 2021) was

higher than average SLO attainment in the prior three semesters (Fall 2018-Fall 2019) in the Math Requirement. (Incidentally, this was also true in Area C1, in Area C overall, but not in Area C2). It is unlikely that the pandemic and its attendant turmoil is good for learning. It is possible that remote instruction or some aspects of remote instruction are good for student learning, and indeed, faculty have mentioned some improvements in instruction as a result of revising material for remote delivery – recorded lectures that students can review more than once, reorganization of information presented to students, the use of visuals and simulations online, etc. Other possibilities include a different profile of students in the class (e.g., some of the students who struggle in math classes may have chosen not to attempt those classes remotely or during a pandemic); a difference in testing (e.g., change of methodology or challenges in maintaining the integrity of remote tests); a greater degree of flexibility with assignments or grades on the part of faculty during this crisis; and other factors we haven't considered. Most likely, a combination of factors influenced the increase in SLO attainment.

- In the prior GELO assessment report for Area C and the Math Requirement (2017), lower rates of proficiency (“meets SLO”) for the Math Requirement (64%) were reported (and for Area C, as well). We do not have a clear explanation for this positive development, the increase of approximately 8% in the Math Requirement in 2022, compared to 2017.

Disaggregated By Course or Subject

Table 4. Courses with SLO Assessments that map to the Math Requirement, by Semester Assessed, Fall 2018 – Spring 2021 (primary terms)

Subject Course	Fall 2018	Spring 2019	Fall 2019	Spring 2020	Fall 2020	Spring 2021	Numbers of semesters assessed	% Met Outcome
ECON 5			X	X	X	X	4	84.3%
ET 50		X					1	100.0%
FIN 136M					X	X	2	69.0%
LALS 5	X	X	X		X	X	5	89.7%
MATH 100A	X	X	X		X		4	75.4%
MATH 100B		X		X		X	3	91.5%
MATH 110A	X	X	X	X	X	X	6	70.7%
MATH 115		X	X		X	X	4	61.5%
MATH 120	X	X	X		X		4	82.5%
MATH 125		X	X			X	3	78.3%
MATH 130	X	X	X	X	X	X	6	83.5%
MATH 46	X	X	X		X	X	5	67.5%
MATH 60	X	X	X	X	X	X	6	69.7%
MATH 70	X	X	X	X	X	X	6	68.0%
MATH 75	X	X	X	X	X	X	6	75.8%
MATH 80	X	X	X	X	X	X	6	69.6%
MATH 90					X	X	2	75.5%
MATH 95					X	X	2	81.3%

Subject Course	Fall 2018	Spring 2019	Fall 2019	Spring 2020	Fall 2020	Spring 2021	Numbers of semesters assessed	% Met Outcome
PHIL 12A					X	X	2	81.8%
PSYC 5			X		X	X	3	81.1%

Note: Some courses were not offered every semester. Also, some courses have SLOs that don't map to the Math Requirement (in addition to the SLOs that do), so even if SLOs were assessed every semester, not all of those assessments would be reflected in this chart.

Discussion and commentary on SLO data disaggregated by subject

- For most of these courses, SLOs were assessed every semester. However, due to the cycle of curriculum updates, SLO data mapped to the current GELOS was not available for all semesters. Also, some courses may have SLOs that don't map to the Math Requirement, even though the course, as a whole, meets the Math Requirement.
- SLO proficiency (met SLO) varied significantly across courses. For the Math Requirement, the range was from 61.5% (Math 115) to 100% (ET 50).
- The Math Department offerings have changed significantly in this time period, and continue to change, in particular with the unification of CSU and UC transfer pathways into Cal-GETC. Math 40 and Math 60 are no longer offered. Students who previously would have been placed in Math 40 and Math 60 are now placed into Math 70, 80, or 90.
- Variation in attainment of the SLOs across the same course in different semesters and/or across courses can sometimes reflect differences in assessment methods, or simply differences in the SLOs themselves. For example, one faculty member mentioned that some SLOs are easier for students to attain than others, and typically just one SLO assessment is reported in CurriQunet each semester per section. So, for a single course, SLO attainment might be over 90% in some semesters and under 70% in other semesters, based on the nature of the SLO assessed.
- It's important to note that this study period (Fall 2018-Spring 2021) was a period of immense changes in the Math Department, resulting from the college's efforts at acceleration (with support classes for Math 90 starting in spring 2019 and for Math 80 starting in fall 2019), AB 705 requirements, and changing practices regarding placement into math classes. In Fall 2019, CCSF changed from using a test to place students in a math class to providing the option of placement based on high school grades or on scores on a standardized test (like AP, ACT, SAT).
- The result of this acceleration has been a greater percentage of students completing the Math Requirement in their first year at CCSF; paradoxically, it has also resulted in a higher percentage of students failing transfer-level math classes. The college continued to offer developmental math classes through the study period (through Spring 2021), though nearly all of those will be discontinued by fall 2023, because of AB 1705. Faculty teaching courses that meet the Math Requirement expressed concern about unintended consequences of acceleration – for example, for those students who fail a math class – at the same time as they appreciate the value of increased completions.

- Higher SLO attainment in online courses has been attributed by faculty to the ability to review lectures (all recorded), less stress than the live classroom, and possibly more difficulty in maintaining the integrity of testing methods. (While the data in this report is not disaggregated online/in-person, most classes prior to the pandemic were face-to-face and nearly all during the pandemic semesters were remote or online.) One faculty member said that their online test scores are way up, compared to face-to-face classes, and that they were shocked by the number of perfect scores. The difficulty of discerning legitimate improvements in scores over time versus those resulting from cheating is a concern not unique to CCSF.
- The math classes vary by their prerequisites. Math 115, for example, has a calculus prerequisite and so it's a select group of students who enroll, mostly those in computer science, so the fairly low SLO proficiency is surprising (61.5%). Math 115 and Math 120 have similar students, but Math 120 has a higher math prerequisite (linear algebra) and a significantly higher SLO proficiency (82.5%).
- There are several different introductory statistics courses offered at the college – Math 80, Econ 5, Psyc 5, and LALS 5. Econ 5, Psyc 5, and LALS 5 all show SLO proficiency of over 80%, while Math 80 shows an SLO proficiency of about 70%. The total number of students enrolled in Math 80 is significantly higher than the enrollment in the other statistics courses combined (over 30 sections of Math 80 offered, compared to 1-4 sections per semester of each of the others). Faculty posited that students who enroll in the more specific statistics courses may be further along in their education and have a reason to take statistics within their chosen discipline, compared to the student body in Math 80 that could include a broader swath of students needing to meet the Math Requirement for degree or transfer. One Econ 5 instructor noted that he tends to have students who are older (and age is correlated to SLO attainment and course success) – including many who have a Bachelor's degree already and take statistics as preparation for graduate school.
- Faculty discussed the difference between math students who are following a STEM pathway (and taking calculus courses) and those following a non-STEM pathway (and more likely to take statistics). There continues to be a significant opportunity gap for historically minoritized students in the equity populations who are less likely to enroll in the STEM pathways. It was also noted, anecdotally, that a lot of older returning students who are changing careers are going into a STEM track, given its higher earnings potential, and older students have higher SLO attainment.
- Faculty teaching statistics also mentioned that changing expectations at the UCs (and likely, in the new CSU-UC aligned CalGETC GE pattern) are causing changes in the courses at the community college level, in particular in relation to use of statistical software. Econ 5 already uses statistical software (such as R or SPSS). If all the various statistics courses add the use of statistical software to their courses, that will carry with it additional needs for computer labs and campus software, along with curriculum updates. Putting math education in technological spaces – in computer labs – would have multiple benefits. Already UC Berkeley has gotten rid of their introduction to statistics class, integrating it into the next higher level (Math 108 equivalent), a harbinger that technology and math visualizations will be an integral part of how math education will need to be in the future, beyond the use of just pencil and paper.

Disaggregated by Demographics

In this section, we present data on SLO attainment by several demographic characteristics, including

- Age
- Ethnicity/race
- Sex/Gender
- Equity Populations, collectively and disaggregated by type
- Age cross tabulated with Equity Population

Age

Table 5. SLO assessments by age group for the Math Requirement, Fall 2018-Spring 2021

Age Group	Count of Assessments	% Met Outcome
19 or less	3,773	68.0%
20-24	3,707	70.5%
25-29	1,958	76.6%
30-34	1,113	78.2%
35-39	595	77.1%
40-49	464	83.8%
50-59	158	71.5%
60+	53	79.2%
All Students	11,821	72.3%

Comments and analysis on age

- The majority of students enrolled in Math Requirement classes are under age 25 (63%).
- The gap between the youngest students (68.0% proficient, under 19) and the highest-proficiency group (83.8%, 40-49) is almost 16%. Across many GE Areas, we see lower SLO proficiency among younger students and roughly continuous improvement of attainment with age, sometimes dropping off in the oldest age group. Data for the Math Requirement mostly follows this pattern, though we also see a drop-off in SLO proficiency in the 50-59 age group in Table 4; however, the 50-59 age group represents less than 2% of students who took a Math Requirement course.
- Faculty in both math and science said that these data match their anecdotal experience – that many of the youngest students struggle in these classes.
- Among the reasons posited for why younger students struggle – perhaps more in this current period than past periods – is the impact of the pandemic itself and pandemic-related changes to education. Younger college students arrive at CCSF with significant learning loss resulting from school closures and remote instruction. There is some evidence low-income students and Black and Latino/a/x students have experienced disproportionate learning loss¹. In addition, many

¹See for example <https://nces.ed.gov/nationsreportcard/> and <https://www.nwea.org/uploads/2022/07/Student-Achievement-in-2021-22-Cause-for-hope-and-concern.researchbrief-1.pdf> Notably, there is variation across states and across school districts – I haven't found data specific to SFUSD.

students have lost family members and family friends to the pandemic itself, experienced job loss within their households, and/or have witnessed or experienced increased rates of violence of various types during this pandemic period (racialized violence and hate crimes, gun violence, intimate partner violence, etc.). The effects of trauma on learning are well known. Older students may have also experienced many of these forms of trauma; however, their high school educations were not affected by covid.

- As overall attainment of the SLOs is higher in the pandemic period compared to the pre-pandemic period, the impact of these pandemic-related traumas on student learning is hard to gauge. It is possible that the populations of students most impacted by trauma failed to enroll in these classes during this period.
- Possibly new approaches to meet the needs of younger students discussed by faculty include a first-year experience course (part of the Equity Plan for 2022-2025) to assist with the transition to college; continued development of support classes (such as Math 80S, Math 90S, and just recently developed, Math 75S).
- In the current Math placement process, students may *choose* to enroll in a Math class with a support class (e.g., Math 80S or Math 90S). There are students who enroll in a support class even if they don't really need it or aren't required to, for example, to bolster their confidence. It would be interesting to compare SLO outcomes for students who opt into the extra support versus those who are required (based on high school performance) to take the extra support.

Ethnicity/Race

Table 6. SLO assessments by ethnicity/race in Math Requirement, Fall 2018-Spring 2021

Ethnicity/Race	Count of Assessments	% Met Outcome
American Indian or Alaska Native	‡	‡
Asian	4,344	77.3%
Black or African American	654	58.9%
Filipino	785	69.4%
Latino/a/x	3,077	65.7%
Native Hawaiian or Other Pacific Islander	86	55.8%
Two or more races	625	71.7%
White	1,915	77.9%
Unknown/Not reported /Other	312	76.6%
All Students	11,821	72.3%

Comments and analysis on race/ethnicity

- Significant opportunity gaps persist across multiple groups of students, disaggregated by ethnicity/race. Black/African American, Latina/o/x, Pacific Islander/Native Hawaiian, and Filipino/a/x students all experience significant (close to or over 3%) opportunity gaps in the Math Requirement.
- Faculty noted a particular concern for Latino/a/x students who represent the group with a substantial opportunity gap in the Math Requirement, given their large numbers (close to one

quarter of all students in the data set). An effective approach toward closing the opportunity gaps for Latino/a/x students would have a broad impact.

- The impacts of changes in math placement were discussed. Now, placement into a math course at CCSF is based entirely on high school performance. To better understand how CCSF math instruction is working to overcome opportunity gaps, it was suggested that we investigate how students, disaggregated by ethnicity/race, do in their CCSF courses compared to high school. For example, are African American students who enter CCSF with a high GPA from high school continuing with that high GPA at CCSF? How about other ethnic/racial groups? Do those who did well in high school continue to do well at CCSF or do they slump? How about those who did poorly in high school – do they improve at CCSF? This could help faculty to understand better the impact of pedagogical approaches and of institutional practices at CCSF (like placement based on high school performance).
- Data on students’ SLO proficiency by race/ethnicity and age, combined, is reported below.

Sex/Gender

Table 7, SLO assessments by sex/gender in the Math Requirement, Fall 2018-Spring 2021

Sex/Gender	Count of Assessments	% Met Outcome
Female/Woman	5,460	74.3%
Male/Man	6,055	70.5%
Neither/Other, Unknown/Not reported	306	73.5%
All Students	11,821	72.3%

Comments and analysis on sex/gender

- While there is a difference in SLO attainment by sex/gender, with students identified as female/woman-identified and neither/other/unknown/not reported generally attaining higher rates of proficiency than students identified as male/man, the difference is relatively small (less than a 3% variation from the overall student average and therefore not an opportunity gap).
- Faculty wondered about the intersection of sex/gender with STEM/nonSTEM courses among the Math Requirement courses. There is a perception that more men/males enroll in the STEM pathway. Among the Math Requirement courses, the STEM pathway courses generally had lower SLO proficiency attainment, and while not a significant equity gap, in general males/men do less well than the categories of female/women or neither/other/unknown. The directionality is unknown – if there is interaction between gender and STEM in math SLO attainment, would it be that that men/male group has a lower proficiency (70.5% met SLO) in the Math Requirement because they are taking STEM pathway courses, or do the STEM pathway courses have lower SLO proficiency because of a larger enrollment by male/men, or are there additional variables affecting both men/males and STEM students that affect the SLO proficiency in these courses?

- Faculty also noted that women, and in particular women of color, do very well in the STEM pathway math courses, in their experience – however, there are very few of them enrolled.

Equity Populations, collectively and disaggregated by type

Table 8. SLO assessments by subpopulations for the Math Requirement, Fall 2018-Spring 2021

Student Demographic Group	Count of Assessments	% Met Outcome
Foster youth and former foster youth	135	62.2%
Veterans	855	70.2%
Students with disabilities	1,046	69.4%
Low-income students	7,549	71.4%
All Students	11,821	72.3%

Table 9. SLO Assessments by equity/not equity group for the Math Requirement by term, Fall 2018-Spring 2021

Term	Not in student equity group	In student equity group(s)	All students	Percentage point gap for equity group
Fall 2018	71.2%	57.9%	65.4%	0.07
Spring 2019	75.6%	62.0%	69.1%	0.07
Fall 2019	73.1%	65.4%	69.4%	0.04
Spring 2020*	88.3%	69.8%	80.3%	0.10
Fall 2020	80.3%	71.0%	76.4%	0.05
Spring 2021	82.3%	71.9%	77.9%	0.06

*= in spring 2020, SLO reporting was optional

Table 10. Overall SLO Assessments by equity/not equity group for the Math Requirement, Fall 2018-Spring 2021

Metric	Not in Student Equity Group	In Student Equity Group(s)	All Students	Percentage Point Gap for Equity Group
% Met Outcome	77.3%	66.1%	72.3%	0.06
Count of Assessments	6,556	5,265	11,821	-

Comments and analysis on equity populations

- The definition of “equity populations” can be found in the [Appendix 2](#). The populations are identified in the CCSF Equity Plan 2022-2025 by measuring that 3% equity gap or evidence of disproportionate impact on one of several state-mandated metrics. SLO attainment (or proficiency) is not one of those metrics but does naturally relate to course completion. At CCSF, disproportionate impact was identified for seven groups; American Indian or Alaska Native, Black or African American, Filipino, Hispanic or Latinx, Native Hawaiian or other Pacific Islander, Disabled, and foster youth/former foster youth students. Other equity populations such as the unhoused, LGBTQ+, and justice-impacted students, exist at the college but we do not have disaggregated SLO data for them.

- The CCCCO definition of an opportunity gap is a 3% gap between the achievement rate of an identified group of students and the average achievement of all students. By this measure, as shown in Table 7, only the subpopulation of foster youth and former foster youth are experiencing an opportunity gap in SLO attainment. Students with disabilities approach that 3% measure, as well.
- There was some discussion among faculty about whether students in equity populations are more or less likely to access academic support services like tutoring, and how intersectionality might influence students' access to services (for example, we know students from historically minoritized populations are overrepresented among the foster care population; students with disabilities from varied class or ethnic/racial backgrounds might have different levels of ease in obtaining and using accommodations; etc.).
- Faculty in the Math Requirement courses noted a significant decrease in access to tutoring in recent years. They noted that some courses used to have embedded tutors every semester, but that they have not had that recently. The tutoring coordinator confirmed that the college has significantly fewer classified staff tutors and student peer tutors than in the past. Possibly related to that, faculty noted that many students who in the past would have completed the course with a C or a low-B have now dropped, instead. The grades for many Math Requirement courses resemble a barbell, with mainly As and Fs. Faculty found that having an in-person embedded tutor helped students a lot and produced a very different distribution of final grades.
- Every Math 80S and Math 90S has had an embedded tutor with extensive training, very engaged and capable, and students have seen them as a valuable resource. When many other courses have lost access to embedded tutors, these courses have continued to have them.
- Faculty were not surprised that foster youth and former foster youth – while a small population – skew lower in SLO attainment. They noted that programs like Guardian Scholars could use more resources, tutors and counselors to assist this population. They were surprised that veterans achieve proficiency at a lower rate, as their anecdotal experience was that veterans were high achievers.
- Faculty in the Math Requirement also noted the disparity in SLO proficiency for students with disabilities. (This disparity is less than 3% for Area C1 and the Math Requirement, and more than 3% for Area C2.) Math Requirement faculty noted that many students with disabilities do not go beyond Math 60, but now Math 60 will no longer be offered, so it will be worth monitoring what happens with this population going forward.
- For Table 9 (Equity/nonEquity Math requirement), there is not a large difference in the average opportunity gap pre-pandemic and pandemic, however, the gap seems to be narrowing over time (excluding Spring 2020). In Fall 2018, we were still pre-AB 705. In Spring 2019, the support course Math 80S launched. In Fall 2019, the support course Math 90S launched. Spring 2019 was the first semester without placement testing, but there was still a majority of math students at the college who had gone through that process prior to Spring 2019. It is possible that the slightly narrowing gap in SLO achievement is related to these developments – the more flexible placement process and the addition of the support courses.

Cross-tabulation of age and equity status

The following table shows the intersection of age and equity status (member or not of an equity group). These data are displayed as a graphic that is regrettably not accessible; however, the data are also presented in an accessible appendix, [Appendix 4](#).

Table 11. SLO assessment results by age and equity/not equity group for Math Requirement, Fall 2018 - Spring 2021

Age Group	Not in equity group(s)		In equity group(s)		All students	Percentage Point Gap
	% Met Outcome	Count of Assessments	% Met Outcome	Count of Assessments		
19 or Less	73.5%	2,204	60.2%	1,569	72.3%	0.12
20-24	75.6%	2,069	64.0%	1,638		0.08
25-29	80.2%	1,039	72.6%	919		No Gap
30-34	83.2%	590	72.5%	523		No Gap
35-39	83.4%	319	69.9%	276		No Gap
40-49	90.6%	234	77.0%	230		No Gap
50-59	81.8%	77	61.7%	81		0.11
60+	*	*	*	*		*
Math Overall	77.3%	6,556	66.1%	5,265	11,821	0.06

* Data not displayed where the count is less than 30.

Comments and analysis on age and equity populations

The opportunity gap affects younger students in particular. Therefore, efforts to close the opportunity gap for younger students would have a large effect on equity, overall.

- In Math Requirement courses:
 - While younger students (under 25) who are not in equity populations achieve at a rate comparable to the college average (though significantly lower than older students not in equity populations), students in equity populations experience an opportunity gap of 12% (<19) and 8% (20-24), compared to the college as a whole.
 - These groups also represent more than half of the entire equity population in the Math Requirement data.
 - Age correlates to SLO attainment within both the equity and the non-equity populations to a similar extent.
- These data suggest that to close the opportunity gap at the college, we must address the needs of younger students from equity populations. Some ideas that arose in conversations with faculty included
 - Assisting students in the transition from a more structured learning environment in high school to a less structured learning environment in college.
 - Build into math courses attention to time management skills.
 - Expand use of LERN 50 / IDST 50 for new students / younger students.
 - Build in more attention to the importance of homework to mastering the skills in math.

- Use of first-year experience courses.
- Opportunity barriers for equity populations persist in the older age groups, even if not as severely as at the younger ages.

Course Completion Data Compared with SLO Attainment Data

Table 12. Course Success Rates by Equity / Not Equity Group for the Math Requirement, Fall 2018-Spring 2021

Term	Not in student equity group	In student equity group(s)	All students	Percentage point gap for equity group
Fall 2018	69.8%	54.2%	62.4%	0.08
Spring 2019	69.7%	51.9%	61.0%	0.09
Fall 2019	66.6%	49.0%	58.0%	0.09
Spring 2020	73.6%	57.0%	65.3%	0.08
Fall 2020	73.4%	56.3%	65.4%	0.09
Spring 2021	74.4%	58.8%	67.0%	0.08
Fall 2018-Spring 2021	71.2%	54.4%	63.1%	0.09

Table 13. SLO Assessment and Overall Course Success Rate for the Math Requirement, Fall 2018-Spring 2021

Metric	Not in student equity group	In student equity group(s)	All Students	Percentage Point Gap
% Met SLO standard	77.3%	66.1%	72.3%	0.06
% Course success	71.2%	54.4%	63.1%	0.09

Comments and analysis on course completion with equity data

- Students in both equity and non-equity populations increased course completion rates in the pandemic period, compared to the pre-pandemic period, yet the gap between equity and non-equity groups remained consistent at 8-9%.
- The gap in SLO proficiency is smaller than that for course completion, as seen in past assessments across GE areas (6% compared to 9%). Differences of completion and SLO data – as grades include all of a student’s work for the semester and SLO assessment usually focuses on a subset of assignments or exams that test competency in one SLO, it’s not surprising they are not the same. In addition, for SLO assessment, only students who remained enrolled in the class are assessed, whereas course completion data includes students who withdraw.
- It was noted above that faculty teaching courses that meet the Math Requirement had experienced more students (especially in equity populations) struggling as access to embedded

tutors has been reduced. Some faculty reported a “barbell” pattern of grades when less tutoring is available, with more As and Fs and fewer students in between (as students who would have, perhaps, been made it to a C or a B with tutoring help perhaps failed or dropped to avoid a bad grade). However, we don’t see this pattern clearly in the completion data. There is certainly an equity gap in completions – a 9% gap for the Math Requirement courses. However, course success rates improved over the six semesters of this report (higher in the pandemic period than the pre-pandemic period), for both equity and non-equity populations, and the opportunity gap in the Math Requirement courses remained roughly the same for all six semesters. If a much higher percentage of students were dropping in recent semesters, in the absence of tutoring support and given other stresses of the pandemic, we would expect to see a lower overall completion rate and/or a greater opportunity gap.

Synthesis of Discussion and Conclusions

- This report analyzes results from 11,821 SLO assessments, across 20 courses that meet the Math Requirement for graduation.
- The average SLO attainment in this period was 72.3% proficiency (“meets SLO”), with a higher attainment in the pandemic semesters compared to the pre-pandemic semesters. Average SLO attainment was notably higher than in the prior assessment of the math requirement in 2017 (66%). We do not have a satisfactory explanation for why SLO attainment grew both in this period overall compared to the prior assessment period, and during the three pandemic semesters compared to the three pre-pandemic semesters within this assessment period.
- As is consistent with most other GELO assessment reports, we see significant opportunity gaps affecting Black/African American, Latino/a/x, Pacific Islander, and Filipino students, as well as foster youth and former foster youth. When the data is broken down by both ethnicity and age, we see that the opportunity gap is concentrated in young students in equity groups (under age 25). This suggests that interventions focused specifically on young students in equity groups would be warranted, to close this opportunity gap.

Any recommendations to changes of wording

- No recommendations.

Appendices

1. Presentations and Resolutions Appendix
2. Methodological Notes
3. Mappings (link to spreadsheet)
4. Accessible data for Table 11, disaggregated by equity group/not and age

Presentations and Resolutions Appendix

Student Learning Outcomes Committee of the Academic Senate

Approval

March 3, 2023

[SLOC Meeting Minutes](#)

Executive Council of the Academic Senate

April 12, 2023, and May 10, 2023

[Resolution](#) 2023.05.10.6B

Additional presentations and discussion of these results:

...

Methodological Notes

Description of the data

The analysis dataset includes all assessment results for student learning outcomes (SLOs) in primary terms mapped to one of the GELOs Area C1 or Area C2, or to the Math Requirement, as of the data extraction date. SLOs that are no longer active or no longer mapped to one of the included GELOs (or the Math Requirement) are not included in the data.

Definitions

Primary term refers to fall semester or spring semester. Student equity groups included in this dataset:

- American Indian or Alaskan Native,
- Black or African American,
- Filipino,
- Latino/a/x,
- Native Hawaiian or other Pacific Islander,
- current or former foster youth,
- students with disabilities,
- students experiencing homelessness, and
- students who identify as transgender or non-binary gender identities.

In Spring 2018, the CCCCO added students who identify as LGBT as a student equity group. That group, in its entirety, is not identified in this dataset because the college does not currently maintain any local data regarding student's sexual orientation. CCSF does have an incomplete subset of locally available data regarding student's gender identity, thus students who identify as transgender or a non-binary gender identity are included as students belonging to a student equity group. While it is understood the

terms gender and sex represent separate, distinct constructs, they are displayed together to accurately represent the underlying data. The language on the questionnaire that collects this demographic data has changed over time and some response options have referred to sex and others to gender, creating a dataset that includes response categories for both gender and sex, combined. Financial aid, disability services, foster youth, housing, and military service statuses each include all students who have ever received the services or benefits for that group.

Percentage point gap is a method developed by California Community Colleges Chancellors' office to measure disproportionate impact, with guidelines to better understand the disaggregated subgroups that are significantly impacted. The detection of disproportionate impact uses a threshold which is adjusted by the sample size of the subgroup, to compare with the percentage point gap. In this report,

- percentage point gap (PPG) = [(% of subgroup) – (overall %)] * (-1)
- threshold = 3% based on the sample size of subgroup (n ≥ 800) If percentage point gap (PPG) ≥ 3%, a disproportionate impact with statistical significance was detected, otherwise no gap exists.

Because small sample sizes do not provide statistically meaningful results, in order to protect student privacy when disaggregating student data, the following thresholds were set for data display:

- Where the count of students is less than 30, the data are not displayed. However, while cells with small counts are masked from display, overall totals and averages always include all assessments among all groups.
- To keep cell sizes above 30 wherever possible, this analysis aggregates across terms or combines groups as appropriate.

Source Prepared by: Carol Liu, Research Analyst

Databases: CurriQunet, Banner Date extracted: 02-22-2022 from CurriQunet; 07-07-2022 from Banner

Internal location: <https://citycollegesf.sharepoint.com/sites/orp/Shared>

Documents/SLO_Assessment/GELO_Area_C-Math/Memo_AreaC+Math_Outcomes_v5.docx

CCSF Math Graduation Requirement Mappings

[Spreadsheet in Sharepoint of the Mappings](#)

Settings on this link: People in the CCSF Organization can view (not edit)

Accessible Data for Table 11

Age Group	Not in Equity Group(s) Count	Not in Equity Group(s) % Met Outcome	In Equity Group(s) Count	In Equity Group(s) % Met Outcome	All Students Count	All Students % Met Outcome	Percentage Point Gap
19 or less	2,204	73.5%	1,569	60.2%	-	-	0.12
20-24	2,069	75.6%	1,638	64.0%	-	-	0.08
25-29	1,039	80.2%	919	72.6%	-	-	No Gap

30-34	590	83.2%	523	72.5%	-	-	No Gap
35-39	319	83.4%	276	69.9%	-	-	No Gap
40-49	234	90.6%	230	77.0%	-	-	No Gap
50-59	77	81.8%	81	61.7%	-	-	0.11
60+	*	*	*	*	-	-	*
All Ages	6,556	77.3%	5,265	66.1%	11,821	72.3%	0.06

* Data not displayed where the count is less than 30.