SAN DIEGO MESA COLLEGE
Institutional Research

STEM Core Annual Outcomes Report (2020/21)

Introduction

STEM Core's main objective is to help students complete pre-requisite courses in order to major in the sciences. It was launched at Mesa College in the fall of 2017 with the support of *STEM Conexiones*, Mesa's Title III, Part F Grant, and Saddleback College's NSF STEM Core Alliance Partner Grant. STEM Core is a cohort-based one-year program with an emphasis on Math. Cohort participants are enrolled in the same course sections and are encouraged to participate in career exploration activities. The program has run for four consecutive years at San Diego Mesa College. Course enrollment and other program requirements have changed each academic year with program improvement in mind. The chart below outlines the course sequences for the 2020-2021 cohort. This report focuses on the academic component of STEM Core. It summarizes the demographic characteristics of participants as well as their course outcomes while seeking to answer the following research question: Is the STEM Core program successful at helping students complete the pre-requisite courses?

Course Sequence

Academic Year	Track	Fall 2020					Spring 2021		
2020/21	One Track Only	MATH015C 16 weeks	MATH116 8 weeks	MATH104 8 weeks	ENG101 16 weeks	PERG120 16 weeks	MATH150 16 weeks	ENG205 16 weeks	*Science Course* 16 weeks

Course Description

Course	Course Title
MATH15C	Intermediate Algebra Support
MATH104	Trigonometry
MATH116	College Algebra
MATH150	Calculus
ENG101	STEM-Contextualized Reading and Composition
ENG205	STEM-Contextualized Critical Thinking and Intermediate Composition
Science	Additional Science Course per major choice

Sources: SDCCD DataMart; SDCCD Institutional Research Database.

Methodology

Comparisons were made between cohort and non-cohort students attempting a comparable math sequence.

Cohorts: When evaluating STEM Core outcomes, only the enrollments in the math cohort sections were examined. This means that if a student left the cohort and took a different section of the same course, that particular outcome was excluded.

Comparison Group: Comparison groups consisted of non-cohort students who took the first course in the math sequence during the relevant fall term, and then proceeded to enroll in a higher level of math (within the course sequence) at Mesa during the same academic year.

Definitions

Headcount: unduplicated count of students; one record per individual.
Enrollment: duplicated count of students; one record for each enrollment at Mesa College.
Course Retention Rate: percentage of students who complete a course with a letter grade of A, B, C, D, F, P, NP, I or RD (any grade other than a W) divided by total official census enrollments (Retention Counts / Enrollment).
Course Success Rate: percentage of students who complete a course with a passing grade (A, B, C, or P) divided by total official census enrollments (Success Counts / Enrollment).
*Excused withdrawals (EW) are excluded from the standard course success calculation.
Course GPA: the total grade point average of all students for a given course.

Data Caveats

STEM Core is a small cohort-based program. This means that any reported outcomes were based on low student counts. While a lot can be learned from this analysis, it is important to keep in mind that the lower the counts, the less generalizable results are. Furthermore, every year, there is a slight variations in the course sequences of the STEM Core.

With the COVID-19 Pandemic, the SDCCD granted Excused Withdrawals (EW) to students who requested it. In Fall 2020, some students chose to receive EW grades and in this report, course success rates were calculated two different ways by including or excluding EW in the denominator. Success rate excluding EW is higher than success rate including EW in the denominator. Please use caution when interpreting the data.

It should also be noted that this report included a limited number of demographic variables. This was due to SDCCD's decision not to convert all application data as it transitioned into the PeopleSoft system in Summer 2019. As a consequence, several demographic variables are not available for all students. In addition to missing application data, some calculated variables no longer exist in the same shape or form in the new database. For example, "financial aid status," a proxy variable for low income students no longer exists in the new database. For these reasons, demographic data were limited to gender, ethnicity, and age in this report. These are provided to better understand the cohort composition, however, due to small counts, student outcomes (retention, success, and GPA) were not disaggregated by these variables to ensure student confidentiality.

Sources: SDCCD DataMart; SDCCD Institutional Research Database.

Highlights

Demographics

- Latinx students made up more than half (61%) of STEM Core 2020/21 students. This suggests that the program is adequately targeting the ethnic population it seeks to serve.
- Female student representation increased in the 2020/21 cohort (61%) compared to the overall female student population at Mesa (56%).

MATH116 (first 8 week), MATH104 (second 8 week) and MATH015C (16 week) in Fall 2020 → MATH150 Sequence in Spring 2021

- A total of 50% of students in the 2020/21 Cohort (14 out of 28) successfully completed the sequence as STEM Core participants.
- The non-STEM Core comparison group's course sequence completion rate was 43% (18 out of 42).

Demographics Analysis

Ethnicity

As an HSI Title III, Part F program, STEM Core focuses on serving Mesa's Latinx population. In 2020/21, Latinx students represented 61% of the STEM Core Cohort. The campus-wide Latinx population in Fall 2020 was 39%. Therefore, STEM Core well reached the program's target student group in the academic year.

STEM Core Cohort by Ethnicity

	2019/20 Cohort		Fall 2020 Campus-wide	
	Students	%	Students	%
African American	1	4%	1,210	5.8%
Asian	3	11%	2,246	10.7%
Filipino	2	7%	937	4.5%
Latinx	17	61%	8,190	39.2%
White	3	11%	6,178	29.5%
Multi-Ethnicity	2	7%	1,611	7.7%
Native American	---	---	50	0.2%
Pacific Islander	---	---	93	0.4%
Unreported	---	---	399	1.9%
Total	28	100%	20,914	100%

Gender

In Fall 2020, the Female student population at Mesa was about 57%. Female student representation in the 2020/21 STEM Core cohort was 61%, which is 4% higher than the campus-wide percentage. It has been noted during the life of the STEM Core program, female

Sources: SDCCD DataMart; SDCCD Institutional Research Database.

students were for the most part underrepresented in the STEM Core program, but 2020/21 female student representation in the cohort was higher than what was reported in prior years. It may be worth investigating further what caused higher female student representation in the STEM Core in 2020/21.

STEM Core Cohort by Gender

	2019/20 Cohort		Fall 2020 Campus-wide	
	Students	%	Students	%
Female	17	61%	11,851	56.7%
Male	11	39%	8,955	42.8%
Non-binary	---	---	31	0.1%
Unreported	---	---	77	0.4%
Total	28	100%	20,914	100.0%

Age

The great majority of STEM Core participants were 18-29 years old (78%). Six students were under 18 in the 2020/21 cohort accounting for 21% of the total cohort. The higher percentage of students under 18 years of age suggests that younger students chose to join the STEM Core program right after high school, which aligns with the program's goals of speeding up students' journeys to careers in the sciences.

STEM Core Cohort by Age

	Cohort	
	Students	%
Under 18	6	21%
18-24	20	71%
25-29	2	7%
Total	28	100%

Outcomes Analysis

MATH116 (first 8 week), MATH104 (Second 8 week), MATH015C (16 week) in Fall 2020 → MATH150 (16 week) in Spring 2021 Sequence

STEM Core 2020/21 participants took two eight-week courses, MATH 116 in the first half of Fall 2020 and MATH104 in the second half of the semester.16-week MATH015C was offered for intermediate college algebra support. STEM Core participants took MATH150 in Spring 2021. The students in the non-STEM Core comparison group attempted MATH104 in Fall 2020 and MATH150 in Spring 2021.

The course sequence completion rate was calculated by dividing the number of students who successfully completed MATH150 in Spring 2021 by the number of STEM Core students who attempted MATH104 in Fall 2020. 2020/21 STEM Core participants' course sequence

Sources: SDCCD DataMart; SDCCD Institutional Research Database.

completion rate was 50% (14/28). The non-STEM Core comparison group's rate was 43% (18/42). Although the STEM Core participants' course sequence completion rate was higher than the non-STEM core comparison group, STEM Core participants' course success rates of three MATH courses were mixed. The STEM Core participants outperformed in MATH116 with a 93% course success rate, compared to a 61% success rate in the comparison group. However, STEM Core participants' course success rate of MATH104 was 75%, which is 1% point lower than the non-STEM Core comparison group's success rate (76%). The course success rate of MATH150 was much lower in STEM Core participants (70%) compared to the non-STEM Core comparison group (82%).

Sequence Completion Rates

	STEM Core	Comparison Group
2020/21	50%	43%

2020/21 Cohort Outcomes

Course	# Weeks	Students	Enrollment	Retention Counts	Retention Rate	Success Counts	Success Rate	Success Rate_EW excluded	GPA
MATH015C	16	28	28	28	100%	27	96%	96%	---
MATH104	8	28	28	28	100%	21	75%	75%	2.70
MATH116	8	28	28	28	100%	26	93%	93%	3.30
MATH150	16	20	20	18	90%	14	70%	70%	2.61

2020/21 Comparison Group Outcomes

Course	# Weeks	Students	Enrollment	Retention Counts	Retention Rate	Success Counts	Success Rate	Success Rate_EW excluded	GPA
MATH015C	Any	3	3	3	100%	3	100%	100%	---
MATH104	Any	42	42	39	93%	32	76%	76%	2.90
MATH116	Any	22	23	19	83%	14	61%	61%	2.16
MATH150	Any	22	22	21	96%	18	82%	82%	3.10

Note. Five hundred forty (540) non-STEM Core students attempted MATH104 in Fall 2020, and 42 of them proceeded to take a higher level of math at Mesa (MATH116 or MATH150) in the same academic year. The comparison group excludes students who did not attempt a higher level of math after MATH104.

For Further Inquiry

1. During the COVID 19 Pandemic, female student representation in the STEM Core 2020/21 was higher (61%) than the prior year's representation. What could have contributed to more female students participating in the STEM Core program in 2020/21?
2. The STEM Core 2020/21 course sequence did not include MATH141 (Pre-calculus), and after completing MATH104 (Trigonometry) and MATH116 (Intermediate Algebra) in Fall 2020, the participants took MATH 150 in Spring 2021. Could the lack of MATH 141 cause a lower course success rate in MATH150 in STEM Core Cohort than their non-STEM Core comparison group?

Sources: SDCCD DataMart; SDCCD Institutional Research Database.