



# Research Brief

## Relationship of Student Success and Counseling Services provided by the CHC HSI STEM Grant in 2013-2014

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### Purpose of Brief

This brief summarizes the academic performance measures of students receiving STEM counseling services and participating in the HSI STEM program at CHC, with an emphasis on Hispanic student outcomes.

### Summary of Findings

- Of the students participating in STEM Trek or STEM Academy, 77 received STEM counseling services in Fall 2013 or Spring 2014. Thirty-one students (43%) were Hispanic, 26 students (36%) were Caucasian, and 8 students (11%) were African-American.
- Students who participated in STEM programs and received STEM counseling services were:
  - substantially ( $ES=.31$ ) and statistically significantly ( $p=.002$ ) more likely to successfully complete the course (84%) than STEM students who did not receive STEM counseling services (72%) and
  - substantially ( $ES=.49$ ) more likely to persist from Fall 2013 to Spring 2014 (97%) than STEM students who did not receive STEM counseling services (86%).
- Hispanic students who participated in STEM programs and received STEM counseling services were:
  - more likely to successfully complete the course (79%) than Hispanic STEM students who did not receive STEM counseling services (61%) and
  - more likely to persist from Fall 2013 to Spring 2014 (100%) than Hispanic STEM students who did not receive STEM counseling services (90%).

### Overview

In response to the second deficit identified in the HSI STEM Grant (Too few Hispanic students are transferring to four year college and universities in STEM), Crafton Hills College (CHC) hired a counselor to advise and counsel students specifically in STEM programs. CHC began to document appointments with students in late Spring 2013. The results presented in this brief illustrate the academic outcomes of students using STEM counseling services in Fall 2013 and Spring 2014 academic terms.

### Methodology

To examine the relationship between students receiving STEM counseling services and academic performance, four comparison groups were created:

1. students participating in STEM Trek/Academy and receiving STEM counseling,
2. students not participating in STEM Trek/Academy and receiving STEM counseling,
3. students participating in STEM Trek/Academy and not receiving STEM counseling, and
4. students neither participating in STEM Trek/Academy nor receiving STEM counseling.

For the purposes of analysis, groups one and three were used to measure of STEM counseling.

Grade on record (GOR) refers to one of the following grades: A, B, C, D, F, CR/P, NC/NP, I, or W. Course completion rate is defined as the number of A, B, C, D, F, CR/P, NC/NP, or I grades divided by the number of GOR. Success is defined as the number of A, B, C, or CR/P grades divided by the number of grades on record. Persistence is defined as earning a GOR in Spring 2014 after earning a GOR in Fall 2013.

The effect size statistic is used to indicate the size of the difference between those who did and did not participate in a learning community. Noticing that even small differences can be statistically significant when large pools of data are analyzed, Jacob Cohen developed one method of interpreting effect size. Cohen defined “small,” “medium,” and “large” effect sizes and explained that an effect size of .20 can be considered small, an effect size of .50 can be considered medium, and an effect size of .80 can be considered large. Accordingly, using Cohen as a guide, a substantial effect would be .20 or higher. Effect size is calculated by dividing the difference of the two means by the pooled standard deviation. It is important to mention that the number of students in each group does not influence Effect Size; whereas, when statistical significance is calculated, the number of students in each group does influence the significance level (i.e., “p” value being less than .05).

### Findings

Table 1 (on page 2) displays the participation rate of students receiving STEM counseling services by ethnicity and STEM program participation. Of the students participating in STEM Trek or STEM Academy, 77 received STEM counseling services in Fall 2013 or Spring 2014. Thirty-one students (43%) were Hispanic, 26 students (36%) were Caucasian, and 8 students (11%) were African-American.

**Table 1. Participation rate by ethnicity and comparison group.**

Ethnicity	Non-STEM Student & not STEM Counseled		STEM Student & not STEM Counseled		Non-STEM Student & STEM Counseled		STEM Student & STEM Counseled	
	#	%	#	%	#	%	#	%
Asian	307	5.5	2	9.1	4	8.5	7	9.6
African American	431	7.7	2	9.1	3	6.4	8	11.0
Hispanic	2,363	42.1	10	45.5	20	42.6	31	42.5
Native American/Alaskan	109	1.9	0	0.0	1	2.1	1	1.4
Caucasian	2,384	42.5	8	36.4	19	40.4	26	35.6
<b>TOTAL</b>	<b>5,594</b>	<b>100.0</b>	<b>22</b>	<b>100.0</b>	<b>47</b>	<b>100.0</b>	<b>73</b>	<b>100.0</b>

Note: '#' refers to the number of students who in each ethnicity group, and '%' refers to '#' divided by the total number of persons in the comparison group.

Table 2 indicates the overall academic performance measures, term GPA, and cumulative GPA for each comparison group. Students who participated in STEM programs and received STEM counseling services were substantially (ES = .32) and statistically significantly (p = .003) more likely to complete the course (95%) than students who participated in STEM programs but did not receive STEM counseling services (87%). Similarly, students who participated in STEM programs and received STEM counseling services were substantially (ES = .31) and statistically significantly (p = .002) more likely to successfully complete the course (84%) than students who participated in STEM programs but did not receive STEM counseling services (72%). Students who participated in STEM programs and received STEM counseling services were substantially (ES = .49) more likely to persist from Fall 2013 to Spring 2014 (97%) than students who participated in STEM programs but did not receive STEM counseling services (86%). Students who participated in STEM programs and received STEM counseling services had substantially (ES = .33) higher term GPAs (3.02) than students who participated in STEM programs but did not receive STEM counseling services (2.69). Students who participated in STEM programs and received STEM counseling services had substantially (ES = .38) higher cumulative GPAs (3.09) than students who participated in STEM programs but did not receive STEM counseling services (2.77).

**Table 2. Academic performance and GPA by comparison group.**

Measurement	Non-STEM Student & not STEM Counseled			STEM Student & not STEM Counseled			Non-STEM Student & STEM Counseled			STEM Student & STEM Counseled			Between STEM Students w/ & w/o STEM Counseling	
	#	N	%	#	N	%	#	N	%	#	N	%	ES	p-value
Success	22,708	31,337	72.5	122	170	71.8	250	302	82.8	416	496	83.9	0.31	0.002
Course Completion	28,476	31,337	90.9	148	170	87.1	294	302	97.4	472	496	95.2	0.32	0.003
Persistence	3,922	5,613	69.9	19	22	86.4	45	47	95.7	71	73	97.3	0.49	0.162
Term GPA	2.49			2.69			2.90			3.02			0.33	0.111
Cumulative GPA	2.60			2.77			2.95			3.09			0.38	0.080

Table 3 displays the overall academic performance measures for each comparison group by ethnicity. Hispanic students who participated in STEM programs and received STEM counseling services were more likely to complete the course (93%) than Hispanic students who participated in STEM program and did not receive STEM counseling services (81%). Hispanic students who participated in STEM programs and received STEM counseling services were more likely to successfully complete the course (79%) than Hispanic students who participated in STEM program and did not receive STEM counseling services (61%). Hispanic students who participated in STEM programs and received STEM counseling services were more likely to persist from Fall 2013 to Spring 2014 (100%) than Hispanic students who participated in STEM program and did not receive STEM counseling services (90%).

**Table 3. Academic performance by ethnicity and comparison group.**

Ethnicity and Measurement		Non-STEM Student & not STEM Counseled			STEM Student & not STEM Counseled			Non-STEM Student & STEM Counseled			STEM Student & STEM Counseled		
		#	N	%	#	N	%	#	N	%	#	N	%
Asian	Success	1,234	1,650	74.8	16	17	94.1	30	33	90.9	40	52	76.9
	Course Completion	1,511	1,650	91.6	16	17	94.1	33	33	100.0	50	52	96.2
	Persistence	206	307	67.1	2	2	100.0	14	15	93.3	7	7	100.0
African American	Success	1,650	2,423	68.1	13	21	61.9	15	15	100.0	39	45	86.7
	Course Completion	2,188	2,423	90.3	18	21	85.7	3	3	100.0	43	45	95.6
	Persistence	290	431	67.3	1	2	50.0	3	3	100.0	7	8	87.5
Hispanic	Success	9,378	13,541	69.3	41	67	61.2	99	130	76.2	173	220	78.6
	Course Completion	12,263	13,541	90.6	54	67	80.6	127	130	97.7	204	220	92.7
	Persistence	1,708	2,363	72.3	9	10	90.0	19	20	95.0	31	31	100.0
Native American/Alaskan	Success	466	635	73.4	0	0	0.0	8	8	100.0	6	6	100.0
	Course Completion	572	635	90.1	0	0	0.0	8	8	100.0	6	6	100.0
	Persistence	73	109	67.0	0	0	0.0	1	1	100.0	1	1	100.0
Caucasian	Success	9,909	12,990	76.3	52	65	80.0	99	116	85.3	158	173	91.3
	Course Completion	11,848	12,990	91.2	60	65	92.3	111	116	95.7	169	173	97.7
	Persistence	1,633	2,384	68.5	7	8	87.5	18	19	94.7	25	26	96.2