



Completion and Success Rates for Academic Year 2013-2014 HSI STEM Learning Community courses

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Purpose of Brief

This brief illustrates the relationship of HSI STEM Grant learning communities with course completion, course success, and term-to-term persistence in Fall 2013 and Spring 2014.

Summary of Findings

- Overall, students in a STEM LC course were substantially ($ES = .21$) and statistically significantly ($p < .001$) more likely to complete the course (95%) than students in stand-alone courses (89%).
- Students in a STEM LC course were statistically significantly ($p = .031$) more likely to persist from Fall 2013 to Spring 2014 (87%) than students in stand-alone courses (80%).
- Students in the Fall 2013 and Spring 2014 Chemistry/Math STEM LC were more likely to substantially and statistically significantly perform better across multiple measures than students in stand-alone courses.
- Students in the Physics/Math STEM LC were more likely to substantially and statistically significantly perform better across multiple measures than students in stand-alone courses.
- Asian, African American, Native American, and Caucasian students in STEM LC courses were substantially ($ES > .20$) and statistically significantly ($p < .050$) more likely to complete the course than students of the same ethnicities in stand-alone courses.

Overview

In response to the third deficit identified in the HSI STEM Grant (Students entering CHC have insufficient mathematics, technological and conceptual science skills), Crafton Hills College (CHC) developed a learning community (LC) program as an alternative learning strategy. LCs link together courses or coursework so students find greater coherence in what they are learning and greater interaction with faculty and peers. In the 2013-2014, CHC offered five LCs under the HSI STEM Grant:

- Fall 2013
 - GEOL-100-92, MATH-090-92, and CHC-090-92
 - CHEM-101-91 and MATH-095-91
- Spring 2014
 - GEOL-100-92, MATH-090-92, and CHC-090-92
 - CHEM-101-91 and MATH-095-91
 - PHYSIC-250-90, MATH-250-90, and LRC-900X4-90

Methodology

To examine the relationship between students in LCs and student performance, students in a STEM LC were compared to student in a stand-alone course taught in the same term. A limitation exists because the methodology does not control for instructor due to a lack of instructors teaching the same course as a STEM LC and as a stand-alone course.

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.

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 indicates that students earning a GOR in STEM LCs were generally similar to students earning a GOR in the same courses offered as stand-alone courses, with the following exceptions. Male students were statistically significantly ($p = .019$) more likely to earn a GOR in a STEM LC course (54%) than male students in stand-alone courses (43%). Female students were substantially ($ES = .20$) and statistically significantly ($p = .005$) less likely to earn a GOR in a STEM LC course (46%) than female students in stand-alone courses (56%). Caucasian students were statistically significantly ($p = .024$) less likely to earn a GOR in a STEM LC course (32%) than Caucasian students in stand-alone courses (39%).

Table 1: Number of students earning a GOR in STEM LC by ethnicity

Demographic	Stand-Alone Course		STEM Learning Community		Total		ES	p-value
	#	%	#	%	#	%		
Gender								
Female	1,364	56.3	100	46.3	1,464	55.5	-.20	.005
Male	1,501	43.4	116	53.7	1,167	44.3	.17	.019
Missing	6	0.2	0	0.0	6	0.2		
Ethnicity								
Asian	116	4.8	15	6.9	131	5.0	.10	.228
African American	180	7.4	22	10.2	202	7.7	.10	.197
Hispanic	1,135	46.9	106	49.1	1,241	47.1	.04	.538
Native American	41	1.7	5	2.3	46	1.7	.05	.557
Caucasian	943	39.0	68	31.5	1,011	38.3	-.15	.024
Other	6	0.2	0	0.0	6	0.2		
Age								
19 or younger	888	36.7	94	43.5	982	37.2	.14	.052
20-24	1,021	42.2	100	46.3	1,121	42.5	.08	.245
25-29	243	10.0	16	7.4	259	9.8	-.09	.164
30-34	119	4.9	2	0.9	121	4.6	-.19	< .001
35-39	51	2.1	2	0.9	53	2.0	-.08	.099
40-49	63	2.6	2	0.9	65	2.5	-.11	.022
50 and above	36	1.5	0	0.0	36	1.4		
Total	2,421	100.0	216	100.0	2,637	100.0		

Note: “#” refers to the number of students in the specified demographic earning a GOR, and “%” refers to “#” divided by the total number of students in the type of course.

Table 2 illustrates the overall course completion, success, and persistence rates for students in STEM LC courses compared to students who earned a GOR in stand-alone courses. Overall, students in a STEM LC course were substantially ($ES = .21$) and statistically significantly ($p < .001$) more likely to complete the course (95%) than students in stand-alone courses (89%). Students in a STEM LC course were nearly substantially ($ES = .18$) and statistically significantly ($p = .031$) more likely to persist from Fall 2013 to Spring 2014 (87%) than students in stand-alone courses (80%).

Table 2: Overall course completion and success rates of students in STEM LC courses

Measurement	Stand-Alone Course			STEM Learning Community			ES	p-value
	#	N	%	#	N	%		
Course Completion	2,139	2,421	88.4	205	216	94.9	.21	< .001
Success	1,384	2,421	57.2	131	216	60.6	.07	.317
Persistence	963	1,211	79.5	99	114	86.8	.18	.031

Note: Persistence is only measured for students who subsequently earned a GOR in Spring 2014 after earning a GOR in Fall 2013.

Table 3 disaggregates completion, success, and persistence rates by each course for students in the STEM LC courses compared to students who earned a GOR the stand-alone courses. Overall, students in the Fall 2013 and Spring 2014 Chemistry/Math STEM LC were more likely to substantially and statistically significantly perform better across multiple measures than students in stand-alone courses. Notably, students in the Spring 2014 CHEM101 STEM LC were substantially (ES = .44) less likely to successfully complete the course (64%) than students in stand-alone courses (75%).

Students in the Spring 2014 Physics/Math/Tutoring STEM LC were more likely to substantially and statistically significantly perform better across multiple measures than students in stand-alone courses.

While performing similarly on all other measures, students in the Fall 2013 Geology/Math/Study Skills STEM LC were substantially (ES = .85) and statistically significantly ($p = .004$) less likely to successfully complete GEOL-100 (43%) than students in the stand-alone GEOL-100 course (84%). Students in the Spring 2014 Geology/Math/Study Skills STEM LC were substantially less likely to successfully complete the courses than students in stand-alone courses.

Table 3: Course completions, success, and persistence rates disaggregated by course

Measurement by Course			Stand-Alone Course			STEM Learning Community			ES	p-value
			#	N	%	#	N	%		
Fall 2013	GEOL-100	Course Completion	22	25	88.0	19	21	90.5	.08	.792
		Success	21	25	84.0	9	21	42.9	-.85	.004
		Persistence	21	25	84.0	18	21	85.7	.05	.875
	MATH-090	Course Completion	342	385	88.8	19	21	90.5	.05	.808
		Success	199	385	51.7	11	21	52.4	.01	.952
		Persistence	315	385	81.8	18	21	85.7	.10	.629
	CHEM-101	Course Completion	125	141	88.7	24	25	96.0	.24	.129
		Success	106	141	75.2	18	25	72.0	-.07	.748
		Persistence	121	141	85.8	22	25	88.0	.06	.764
	MATH-095	Course Completion	581	660	88.0	25	25	100.0	.37	< .001
		Success	356	660	53.9	20	25	80.0	.52	.002
		Persistence	506	660	76.7	22	25	88.0	.27	.098
Spring 2014	GEOL-100	Course Completion	15	16	93.8	7	8	87.5	-.22	.659
		Success	9	16	56.3	2	8	25.0	-.61	.147
	MATH-090	Course Completion	427	478	89.3	7	8	87.5	-.06	.884
		Success	236	478	49.4	3	8	37.5	-.24	.520
	CHEM-101	Course Completion	128	145	88.3	22	22	100.0	.39	< .001
		Success	108	145	74.5	12	22	54.5	-.44	.084
	MATH-095	Course Completion	418	478	87.4	22	22	100.0	.39	< .001
		Success	289	478	60.5	14	22	63.6	.06	.767
	PHYSIC-250	Course Completion	32	40	80.0	15	17	94.1	.21	.427
		Success	22	40	55.0	13	17	76.5	.44	.111
	MATH-250	Course Completion	49	53	92.5	17	17	100.0	.32	.043
		Success	38	53	71.7	12	17	70.6	-.02	.932

Note: CHC courses are excluded from this table, because they are not offered as stand-alone courses. LRC courses are excluded from this table, because students do not earn a GOR in the course. Persistence is measured by students earning a GOR in Spring 2014 after earning a GOR in Fall 2013; therefore, the measurement is only applicable to Fall 2013 courses.

Table 4 disaggregates completion, success, and persistence rates by ethnicity for students in the STEM LC courses compared to students who earned a GOR in the stand-alone courses. Asian, African American, Native American, and Caucasian students in STEM LC courses were substantially ($ES > .20$) and statistically significantly ($p < .050$) more likely to complete the course than students of the same ethnicities in stand-alone courses. Native American and Caucasian students in STEM LC courses were substantially ($ES > .20$) more likely to successfully complete the course and persist from Fall 2013 to Spring 2014 than Native American and Caucasian students in stand-alone courses. Asian students in STEM LC courses were substantially less likely to successfully complete the course or persist from Fall 2013 to Spring 2014 than Asian students in stand-alone courses.

Table 4: Course completion, success, and persistence rates disaggregated by ethnicity

Measurement by Ethnicity		Stand-Alone Course			STEM Learning Community			ES	p-value
		#	N	%	#	N	%		
Asian	Course Completion	104	116	89.7	15	15	100.0	.36	< .001
	Success	68	116	58.6	7	15	46.7	-.24	.398
	Persistence	46	54	85.2	7	10	70.0	-.40	.347
African American	Course Completion	162	180	90.0	22	22	100.0	.35	< .001
	Success	101	180	56.1	11	22	50.0	-.12	.597
	Persistence	65	87	74.7	11	13	84.6	.23	.388
Hispanic	Course Completion	1,005	1,135	88.5	99	106	93.4	.15	.063
	Success	618	1,135	54.4	60	106	56.6	.04	.670
	Persistence	457	568	80.5	49	57	86.0	.14	.265
Native American	Course Completion	35	41	85.4	5	5	100.0	.43	.012
	Success	23	41	56.1	5	5	100.0	.89	< .001
	Persistence	17	24	70.8	3	3	100.0	.65	.005
Caucasian	Course Completion	828	943	87.8	64	68	94.1	.20	.040
	Success	572	943	60.7	48	68	70.6	.20	.087
	Persistence	375	474	79.1	29	31	93.5	.36	.003

Any questions regarding this brief can be directed to the Office of Institutional Effectiveness, Research, and Planning at (909) 389-3390 or you may send an email to bgamboa@craftonhills.edu; RRN 891 STEM LC Performance 1314.docx; Grades_CHC_GOR_1314_STEMLC.sav.