

**To:** Learning in Communities Program Coordinators

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**Subject:** Learning in Communities Participation on Students' Academic Outcomes

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This analysis compares the characteristics of students who participated in LinC courses to non-LinC students and compares their longer-term academic outcomes including persistence, units taken, GPA, and remedial course sequence completion. A LinC student was identified as a student who enrolled in a LinC section in their first or second term of their first year of enrollment.<sup>1</sup> Non-LinC students are those who were enrolled at De Anza for at least two terms but never took a LinC section. Students enrolled in LinC sections between 2012-13-2015-16 were included and tracked for one year. A multiple regression analysis was used to control for potentially confounding background characteristics.<sup>2</sup>

In the broader scope of our ongoing equity work, it is important to understand differences in outcomes for students within a particular program compared to those not enrolled in the program as well as differences among students within the program including by ethnicity, gender, and low income status. This information may help the college improve the program, as well as transfer particular aspects of the program that are working for a particular group to other programs in order to provide the greatest benefit to students.

### **Important highlights include:**

**Student Demographics:** LinC participants are more likely to be younger, a first-generation college student, and come from families with lower levels of parental education, and are more likely to be from a minority ethnic group other than White.

**Enrollment Demographics:** LinC participants are more likely to be first-time students (as opposed to returning, transfer, or continuing students) who intend to transfer to a four-year institution. Within their first-term, LinC students enroll in a higher number of courses, are less likely to take online courses, and are more likely to complete the matriculation process, which is associated with positive outcomes.

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<sup>1</sup> Roughly 80% of all students enrolled in LinC courses did so in their first or second term. The remaining 20% are classified as LinC "outliers" and are not used in the main analyses.

<sup>2</sup> Multiple analytic methods were explored including propensity score matching and coarsened exact matching techniques, but all results were essentially identical. For simplicity of presentation only results from the multiple regression analysis were included.

**Academic Outcomes:** LinC students generally exhibit stronger academic outcomes than non-LinC students. LinC students had higher English completion rates, as they were 8 percentage points more likely to pass EWRT1A if they started in either EWRT200 or 211. LinC participants performed significantly better in Math coursework as well, though not as large as English and LinC students were not statistically more likely to complete the math sequence; which may be attributable to LinC offering fewer math sections. Success rates for LinC students in math courses may increase if the program were to expand the math course offerings.

**Differences by Subgroups:** LinC participation for African American and Latino/a students led to larger increases in passing the lowest level Math courses; these students who started in a lower level math course were 4 percentage points more likely to pass college-level math than non-LinC students, but White and Asian students who participated in LinC did not experience the same benefit.

- Female LinC students appeared to benefit more from LinC participation than males; females were more likely to take and pass college-level Math courses. Female students who started in lower-level math courses but participated in LinC were 5 percentage points more likely to pass college-level Math, but males showed no positive impacts from LinC participation.
- Low-income LinC participants were 21 percentage points more likely to pass an English course compared to non-LinC low-income participants. Low-income LinC participants were 13 percentage points more likely to pass a Math course compared to non-LinC low-income participants.

### **Descriptive Analysis of LinC and non-LinC Participants**

Table 1 examines demographic and initial academic differences between LinC and non-LinC participants. The first two columns provide descriptive statistics (general information about the student), the third column provides the difference between the two groups, and the last column contains an asterisk if the difference between LinC and non-LinC participants is statistically different from zero (that the difference between the variables can be attributed to something other than random chance).

### **Student Demographics**

- LinC students are younger than non-LinC students (19.9 vs. 25.4 years old).
- LinC students are more likely to identify as Asian or Latino/a (52% and 33%) than non-LinC students (47% and 24%, respectively).
- There are no statistically significant differences in the likelihood that LinC students are more likely to be female or low-income than non-LinC students.
- LinC students are more likely to have parents whose highest education level is high school or equivalent (90% vs. 74%) or first-generation (35% vs. 25%).

## Enrollment Characteristics

- LinC students were more likely to list their academic goal as transfer (88% vs. 62%). They were slightly less likely to list an academic goal of earning a degree (4% vs. 8%) and much less likely to list “other” goals (9% vs. 30%).
- LinC students were much more likely to be first-time students (64% vs. 24%), rather than continuing, returning, or transfer students.
- Within their first term of attending De Anza, LinC students:
  - Took more courses (2.8 vs. 2.3 courses) but were less likely to take these class online (8% vs. 26%)
  - Had a term GPA that was statistically equivalent to non-Liin students
  - Were more likely to have completed a number of key matriculation activities, including: taking a placement exam (80% vs. 45%); attending orientation (71% vs. 37%); applying for financial aid (69% vs. 51%); and completing an education plan (59% vs. 28%).

**Table 1. Descriptive Statistics, LinC vs. Non-LinC Students**

	LinC	Non-LinC	Difference	
Sample Size	2,102	50,026		
<b>Student Demographics</b>				
Age	19.9	25.4	-5.6	*
Asian	51.9%	46.8%	5.1%	*
Black	6.0%	4.5%	1.5%	*
Latino/a	32.9%	24.2%	8.7%	*
White	7.3%	22.2%	-14.9%	*
Female	50.4%	49.0%	1.4%	
Low-Income	22.3%	21.5%	0.8%	
Highest Ed. Level: HS/Equivalent	90.0%	74.0%	16.0%	*
First-Generation	35.2%	25.3%	9.9%	*
<b>Enrollment Characteristics</b>				
<i>Academic Goal</i>				
Degree	3.9%	7.6%	-3.7%	*
Transfer	87.5%	62.3%	25.2%	*
Other (incl. Certificate)	8.6%	30.0%	-21.4%	*
<i>Student Type</i>				
Continuing	12.8%	26.0%	-13.2%	*
Transfer	20.5%	32.0%	-11.5%	*
First-Time	64.3%	24.4%	39.9%	*
Returning	2.5%	17.4%	-14.9%	*
<i>First Term Outcomes</i>				
GPA	3.1	3.1	0.0	
No GPA available	8.4%	10.3%	-1.9%	*
Number of Courses Taken	2.8	2.3	0.6	*
Took a Placement Test	80.3%	44.5%	35.8%	*
Attended Orientation	70.9%	36.8%	34.1%	*
Applied for Financial Aid	69.1%	51.1%	18.0%	*
Completed an Education Plan	59.3%	27.9%	31.4%	*
Took an Online Course	7.8%	25.9%	-18.1%	*

Column 1 describes LinC students who enrolled in the program within their first or second term from initial enrollment. Column 2 includes all non-LinC students who were enrolled at De Anza for at least two terms. Column 3 shows differences between LinC and non-LinC students, with a test of statistical significance between these groups in column 4, where an asterisk (\*) indicates a p-value of less than 0.01.

## Academic Outcomes

LinC students generally exhibit stronger academic outcomes than non-LinC students. All results are based on regression analysis that controls for differences in background demographic and first-term enrollment characteristics (controls for differences in student's background and enrollment characteristics to make them as similar as possible).<sup>3</sup> Baseline values are reported for non-LinC students to compare LinC students to.

Table 2 shows the regression-adjusted differences in student persistence, units and courses taken, GPA and success rate, and various basic skills course outcomes:

- LinC students were 3 percentage points (baseline=89%) more likely to persist to the second term and 8 percentage points (baseline=71%) more likely to persist to the second year.
- LinC students are enrolled for 6.9 terms compared to 5.5 for non-LinC students.
- LinC students attempt 15 more units and earn 11 more units than non-LinC students and take 2.9 more courses (baseline=14). Courses identified as either degree/transfer but not vocational account for 2.1 of the additional courses with the remaining increase in basic skills courses.
- While LinC participants had a slightly higher overall course success rate (1.1% increase), this was not a statistically significant difference.
- LinC students' average GPA was slightly lower by 0.05 points (baseline=2.7). One possibility is their increased persistence led them to take more difficult courses over time.
- LinC participants performed significantly better in English coursework, as they were:
  - 13 percentage points more likely to pass any English course (baseline=39%)
  - 14 percentage point more likely to pass EWRT200 (baseline=4%)
  - 38 percentage points more likely to pass EWRT211 level (baseline=17%)
  - 15 percentage points more likely to pass EWRT1A or higher (baseline=34%)
- LinC students also had higher sequence completion rates, for example, they were 8 percentage points more likely to pass EWRT1A if they started in either EWRT200 or 211 (baseline=59%); they also passed EWRT1A in 0.8 fewer terms (baseline=4.9).
- LinC participants performed significantly better in Math coursework, though not as large as the English results:
  - 9 percentage points more likely to pass any Math course (baseline=44%)
  - 15 percentage points more likely to pass Math210 or 212 courses (baseline=15%)
  - 11 percentage points more likely to pass MATH114 or 217 (baseline=17%)
  - 4 percentage point more likely to pass MATH10 or higher (baseline=31%)
- LinC students were not statistically more likely to complete the math sequence. One reason may be that LinC offers fewer math sections. Success rates for LinC students in math courses may increase if the program were to expand the math course offerings.

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<sup>3</sup> The regression model includes the following demographic controls: age, ethnicity, gender, low-income status, first-generation status, parent education level, individual variables for their first term of enrollment, academic goal (transfer, degree, or other), and student type (first-time, continuing, returning, transfer). Academic controls are all based on a student's first enrolled term, and include: GPA, whether GPA was missing (to include students who might have taken courses pass/no pass), the number of courses taken, whether a student participated in the matriculation process (placement exam, orientation, financial aid application, and education plan), and whether they took a course online.

Table 2. Impact of LinC Participation on Student Outcomes

	Baseline value for non-LinC students	Impact of LinC participation	
<i>Persistence</i>			
Persisted to 2nd year	70.5%	7.8%	*
Persisted beyond 2nd year	89.1%	2.6%	*
<i>Course-Taking</i>			
Number of terms attended	5.5	0.9	*
Number of units attempted	55.1	14.8	*
Number of units earned	41.3	11.3	*
Number of courses taken	13.8	2.9	*
Number of courses taken: Degree/Transfer Applicable	9.4	2.1	*
Number of courses taken: Vocational	3.1	-0.2	*
Number of courses taken: Basic Skills	1.3	1.0	*
<i>Course Performance</i>			
Success rate	72.4%	1.1%	
GPA	2.72	-0.05	*
<i>Math and English Remediation</i>			
<u>English Courses</u>			
Took English	44.6%	14.5%	*
Passed English	38.9%	13.1%	*
Took EWRT200	4.4%	14.0%	*
Took EWRT211	19.3%	39.0%	*
Passed EWRT1A or higher	38.5%	17.7%	*
Passed EWRT200	3.7%	14.1%	*
Passed EWRT211	16.8%	37.8%	*
Passed EWRT1A or higher	34.2%	14.6%	*
Took EWRT1A or higher if started in 211 or 200	64.8%	11.1%	*
Passed EWRT1A or higher if started in 211 or 200	59.0%	7.6%	*
Terms to Taking EWRT1A or higher if started below	4.7	-0.8	*
Terms to Passing EWRT1A or higher if started below	4.9	-0.8	*
<u>Math Courses</u>			
Took Math	54.5%	8.3%	*
Passed Math	44.2%	9.1%	*
Took Math210 or 212	19.7%	15.3%	*
Took Math114 or 217	21.3%	13.1%	*
Took Math10 or higher	38.0%	5.0%	*
Passed Math210 or 212	15.0%	15.0%	*
Passed Math114 or 217	16.8%	11.4%	*
Passed Math10 or higher	31.2%	3.9%	*
Took Math 10 or higher if started in 210/212 or 114/217	44.8%	2.5%	
Passed Math 10 or higher if started in 200/211 or 114/217	35.0%	2.1%	
Terms to Taking Math10 or higher if started below	5.2	-0.2	
Terms to Passing Math10 or higher if started below	5.7	-0.1	

Column 1 shows baseline values from non-LinC students, column 2 provides the academic outcomes of LinC student who enrolled in the program within their first or second term from initial enrollment, compared to demographically and academically similar non-LinC students. Column 3 shows a test of statistical significance from zero, where an asterisk (\*) indicates a p-value of less than 0.01. Column 4.

### Outcomes: Subgroup Differences

Table 3 replicates the outcome results from Table 2, but does so separately for key subgroups of interest: White, Asian, and Other Minority students (African American and Latino/a); males and females; and low- and high-income students. In general, all groups of students appear to benefit from LinC participation, though individual results vary. Key differences include:

#### Ethnicity:

- Minority groups tended to have slightly better outcomes than Asian students but lower outcomes than White students in LinC.
- There are few large differences between ethnic groups in almost any category studied.
  - The only meaningful difference is that LinC participation for minority students led to larger increases in passing the lowest level Math courses (17%) compared to the benefits for white (12%) and Asian (13%) students. In addition, minority students who started in lower level math courses were 4 percentage points more likely to pass college-level math than non-LinC students, but White and Asian students who participated in LinC did not experience the same benefit.

#### Gender:

- In a number of areas, females appeared to benefit more from LinC participation than males. Compared to males, females who participated in LinC:
  - Took one more course and earned 5 more units;
  - Has a course passage rate 2 percentage points higher
  - Were more likely to take and pass college-level Math courses. In particular, female students who started in lower-level math but participated in LinC were 5 percentage points more likely to pass college-level Math, but males showed no positive impacts from LinC participation.

#### Income:

- There were few large differences between low- and high-income students who participated in LinC. The largest differences were in English and Math course participation:
  - Low-income LinC participants were 21 percentage points more likely to pass an English course compared to non-LinC low-income participants; the similar benefit for high-income students was only 11 percentage points.
  - Low-income LinC participants were 13 percentage points more likely to pass a Math course compared to non-LinC low-income participants; the similar benefit for high-income students was 8 percentage points.

Table 3. Impact of LinC Participation on Student Outcomes, by Subgroups

	White	Asian	Minority Ethnicity	Female	Male	Low- income	High- income
<i>Persistence</i>							
Persisted to 2nd year	9.0% *	6.9% *	7.9% *	8.9% *	6.7% *	11.2% *	6.9% *
Persisted to 3rd quarter or later	2.6%	2.4% *	3.0% *	2.7% *	2.6% *	2.7%	2.6% *
<i>Course-Taking</i>							
Number of terms attended	0.9 *	0.7 *	0.9 *	0.9 *	0.8 *	1.1 *	0.8 *
Number of units attempted	16.6 *	12.2 *	16.9 *	16.6 *	12.8 *	16.5 *	14.1 *
Number of units earned	11.9 *	10.2 *	12.3 *	13.8 *	8.5 *	13.1 *	10.6 *
Number of courses taken	3.6 *	2.4 *	3.2 *	3.4 *	2.4 *	3.4 *	2.8 *
Number of courses taken: Degree/Transfer Applicable	2.9 *	1.5 *	2.5 *	2.4 *	1.8 *	2.5 *	1.9 *
Number of courses taken: Vocational	-0.5	0.0	-0.4 *	0.0	-0.4 *	-0.3	-0.2
Number of courses taken: Basic Skills	1.2 *	0.9 *	1.1 *	1.1 *	1.0 *	1.1 *	1.0 *
<i>Course Performance</i>							
Success rate	0.6%	1.4% *	0.9%	2.2% *	-0.1%	2.2%	0.8%
GPA	-2.5%	-2.2%	-5.4%	-1.1%	-8.4% *	0.1%	-5.7% *
<i>Math and English Remediation</i>							
<u>English Courses</u>							
Took English	16.9% *	14.0% *	13.8% *	15.5% *	13.5% *	22.7% *	12.4% *
Passed English	12.5% *	13.3% *	12.0% *	13.2% *	12.9% *	21.0% *	11.0% *
Took EWRT200	9.8% *	15.6% *	11.4% *	15.2% *	12.7% *	20.0% *	12.4% *
Took EWRT211	44.9% *	34.9% *	41.2% *	38.9% *	39.0% *	43.6% *	37.7% *
Passed EWRT1A or higher	18.9% *	15.5% *	20.2% *	18.9% *	16.4% *	22.8% *	16.4% *
Passed EWRT200	10.5% *	14.9% *	12.5% *	15.2% *	12.9% *	20.3% *	12.5% *
Passed EWRT211	43.2% *	34.3% *	39.2% *	38.4% *	37.1% *	42.6% *	36.4% *
Passed EWRT1A or higher	11.9% *	14.4% *	15.5% *	15.5% *	13.5% *	19.9% *	13.1% *
Took EWRT1A or higher if started in 211 or 200	10.6% *	7.4% *	15.5% *	11.5% *	10.4% *	13.6% *	10.5% *
Passed EWRT1A or higher if started in 211 or 200	3.0%	6.4% *	10.4% *	7.2% *	7.9% *	10.4% *	6.9% *
Terms to Taking EWRT1A or higher if started below	-0.9 *	-0.6 *	-1.1 *	-0.8 *	-0.8 *	-1.0 *	-0.8 *
Terms to Passing EWRT1A or higher if started below	-1.1 *	-0.5 *	-1.1 *	-0.8 *	-0.7 *	-1.0 *	-0.7 *



Table 3. Impact of LinC Participation on Student Outcomes, by Subgroups - Continued

	White	Asian	Minority Ethnicity	Female	Male	Low- income	High- income
Math Courses							
Took Math	0.127 *	0.074 *	0.079 *	0.079 *	0.084 *	0.105 *	0.077 *
Passed Math	0.126 *	0.068 *	0.107 *	0.098 *	0.081 *	0.132 *	0.081 *
Took Math210 or 212	0.136 *	0.142 *	0.156 *	0.146 *	0.157 *	0.166 *	0.149 *
Took Math114 or 217	0.12 *	0.107 *	0.138 *	0.136 *	0.123 *	0.147 *	0.125 *
Took Math10 or higher	0.121 *	0.031 *	0.057 *	0.073 *	0.025	0.087 *	0.04 *
Passed Math210 or 212	0.117 *	0.131 *	0.165 *	0.147 *	0.149 *	0.175 *	0.143 *
Passed Math114 or 217	0.108 *	0.11 *	0.105 *	0.128 *	0.098 *	0.15 *	0.103 *
Passed Math10 or higher	0.077 *	0.027	0.049 *	0.067 *	0.01	0.067 *	0.032 *
Took Math 10 or higher if started in 210/212 or 114/217	0.057	-0.004	0.045 *	0.052 *	-0.005	0.065 *	0.015
Passed Math 10 or higher if started in 200/211 or 114/217	0.01	0.006	0.039 *	0.05 *	-0.009	0.061 *	0.012
Terms to Taking Math10 or higher if started below	-0.631	-0.024	-0.257	-0.149	-0.272	-0.069	-0.221
Terms to Passing Math10 or higher if started below	-0.072	0.141	-0.337	-0.187	0.028	-0.083	-0.075

Each column provides the academic outcomes of LinC students who enrolled in the program within their first or second term from initial enrollment, compared to demographically and academically similar non-LinC students. Asterisks (\*) indicate that a test of statistical significance from zero has high likelihood, with a p-value of less than 0.01.