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# **The Study of Deeper Learning: College, Work, and Civic Participation in the First 6 Years After High School**

**Prepared for**

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# **The Study of Deeper Learning: College, Work, and Civic Participation in the First 6 Years After High School: Technical Appendix**

**May 2021**

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## I. Introduction

The *Study of Deeper Learning: Opportunities and Outcomes* is a proof-of-concept study focused on students who attended high schools with at least moderately well implemented network approaches targeting deeper learning (network schools) and schools that were not implementing network approaches targeting deeper learning but served similar populations of students (non-network schools). The study was conducted in pairs of network and non-network schools that serve similar student populations in several districts in California and New York City. Relying on follow-up survey data and data from the Studenttracker service at the National Student Clearinghouse, a follow-up study conducted between 2019 and 2021 examined differences in students' college, workforce, and civic engagement outcomes up to 6 years after expected high school graduation.

This technical appendix provides additional study information for Report 6, *Deeper Learning and Civic Engagement and Workforce Outcomes*. This appendix provides an extended description of the study's sampling procedures, data sources, analytic methods, and results. It begins by describing how network and non-network schools were selected and recruited to participate in the study. After presenting the characteristics of the participating schools, we describe the student samples, the selection of student samples for primary data collection, and the levels of student attrition between Grade 9 entry and data collection. After describing the high school and follow-up survey instruments, we provide information about the creation of weights and the statistical models used within the report. The appendix concludes with tables that contain the findings discussed in the report.

## II. Study Sample

### A. Network School Recruitment and Comparison School Selection

In 2011–12, the Hewlett Foundation selected ten school networks to participate in what would become the “Deeper Learning Community of Practice.” The purpose of this community of practice is to share strategies, tools, and lessons that both contribute to the work of the networks themselves and build the broader knowledge base about deeper learning. The main selection criteria for the networks were as follows:

- The networks needed to have experience in—and an explicit focus on—promoting a deep understanding of content and the kinds of competencies reflected in the Hewlett Foundation's identified dimensions of deeper learning.
- They needed to do this across whole schools serving diverse populations of students (rather than targeting only certain portions of the students or teachers in a school).

The Hewlett Foundation selected the Community of Practice networks prior to the start of the *Study of Deeper Learning: Opportunities and Outcomes*. The 10 networks represented in this study have a well-established history of promoting deeper learning and all share an emphasis on providing educational opportunities for minority students and students from low-income families to prepare them for college and career. For the original study, we recruited a set of 20 network high schools from the 10 networks. The criteria for network school selection are reported in Exhibit 2.1.

Given the small number of network schools in the sample, and given the criteria used to select the sample, the study’s findings are limited in terms of their generalizability. For example, the 10 networks include many schools that were excluded by the study’s criteria (such as elementary and middle schools, very small schools, schools without substantial disadvantaged populations, and schools that opened very recently). Furthermore, because we included only moderate to high implementers of the network models, findings cannot be generalized to all schools trying to implement a deeper learning approach.

### Exhibit 2.1. Network and Non-Network School Eligibility Requirements

	Network School Criteria	Non-Network School Criteria
Regular high school (i.e., not a special education, vocational, or alternative high school)	✓	✓
Non-magnet school	✓	✓
Non-charter school		✓
Low grade is Grade 9		✓
Low grade is Grades K–9	✓	
High grade is Grade 12	✓	✓
>25% of students are eligible for free or reduced-price lunch	✓	✓
200+ students enrolled in Grades 9–12	✓	✓
Been in the network since the 2007–08 school year	✓	
Schoolwide implementation of the network approach	✓	
A moderate or high implementation rating from the network	✓	
Within the same district as a network school or a surrounding district		✓

*Note.* Some deeper learning networks begin focusing on deeper learning competencies before Grade 9. While these network schools included grades below Grade 9, we selected for our study students who did not attend a deeper learning network school until Grade 9. No non-network schools selected for the study had students below Grade 9.

To select non-network schools, we first identified schools with a population of incoming Grade 9 students similar to the incoming Grade 9 students at the network schools. We identified a set of eligible non-network schools located in the same school district as the network school (if the network school was operated by a school district), or within the surrounding school district of the network school (if the network school was operated by a charter school management organization). Schools were identified using the 2007–08, 2008–09, and 2009–10 Common Core of Data (CCD) and were deemed eligible if they met the criteria in Exhibit 2.1. Specifically, we used the 2007–08 data to determine whether the school was in existence as of the 2007–08 school year, and we used averages from the 2008–09 and 2009–10 school years to determine the overall number of students and the percentage of students eligible for free or reduced-price

lunch. We expected the distribution of students across racial/ethnic categories to be relatively stable across years for most schools, so we relied on the 2009–10 data.<sup>1</sup>

Based on the CCD data, we identified up to five matches for each network school relying on Mahalanobis distances that were computed using four variables: the average percentage of students eligible for free or reduced-price lunch, the percentage of African American students, the percentage of Hispanic students, and the percentage of White students from the 2008–09 and 2009–10 CCD. To guard against matching dissimilar schools, we required comparison schools to be within one standard deviation of its paired network school on each of the four variables we used to calculate Mahalanobis distance. After receiving extant district data, we compared the Grade 8 achievement of students in the network school and students in the selected comparison schools to determine priorities for school recruitment.

An overview of the matched school pairs that were included in the *Study of Deeper Learning* is provided in Exhibit 2.2.<sup>2</sup> Report 6 includes all schools from Pair 1 through Pair 11.

### Exhibit 2.2. Description of School Pairs

		Enrollment	% Female	% African American	% Hispanic	% Asian	% FRPL
Pair 1 (CA)	Network (1N)	400	70	30	40	10	70
	Non-Network (1C)	2100	50	20	20	30	40
Pair 2 (CA)	Network (2N)	300	50	10	40	0	40
	Non-Network (2C)	1600	50	20	30	10	50
Pair 3 (CA)	Network (3N) <sup>a</sup>	400	50	20	50	10	60
	Non-Network (3C)	1800	50	40	20	20	50
Pair 4 (CA)	Network (4N)	300	50	0	90	10	50
	Non-Network (4C)	2300	50	0	90	10	70
Pair 5 (CA)	Network (5N)	400	50	0	100	0	40
	Non-Network (4C)	2300	50	0	90	10	70
Pair 6 (CA)	Network (6N)	600	50	10	10	10	30
	Non-Network (6C)	2600	50	10	30	0	20
Pair 7 (CA)	Network (7N1)	400	50	10	10	10	40
	Network (7N2)	400	50	10	10	10	40
	Non-Network (7C)	2500	50	10	30	10	50

<sup>1</sup> While we expected school characteristics to be reasonably stable from 2007–08 to 2009–10, schools that had recently opened might have experienced changes in enrollment during the first few years after opening. For example, if a school opened in 2007–08, and it first enrolled only Grade 9 students and added a grade each year, its highest grade would have been Grade 9 in 2007–08, Grade 10 in 2008–09, and Grade 11 in 2009–10. Similarly, the school’s enrollment would have increased over the same period. As such, selection criteria were modified for recently opened schools. To ensure a sufficient sample size for schools that had recently opened, we removed schools with fewer than 200 students, *on average*, between the 2008–09 and 2009–10 school years (rather than within each school year), even if the school only had two and three cohorts of students in those years, respectively.

<sup>2</sup> In addition to the school pairs listed in Exhibit 2.2, qualitative data were collected from four network schools for which we were unable to identify an appropriate matched non-network school, due to either unique school features or inability to access administrative, student-level data.

		Enrollment	% Female	% African American	% Hispanic	% Asian	% FRPL
Pair 8 (NY)	Network (8N)	500	60	10	20	10	40
	Non-Network (8C)	600	60	10	20	20	50
Pair 9 (NY)	Network (9N)	400	60	40	60	0	80
	Non-Network (9C)	400	40	40	50	0	70
Pair 10 (NY)	Network (10N)	400	40	0	40	60	100
	Non-Network (10C1)	600	50	0	100	0	80
	Non-Network (10C2)	500	50	0	90	10	90
Pair 11 (NY)	Network (11N)	400	50	20	40	30	100
	Non-Network (10C1)	600	50	0	100	0	80
	Non-Network (10C2)	500	50	0	90	10	90
Pair 12 (CA)	Network (12N)	300	50	60	30	0	40
	Non-Network (3C)	1800	50	40	20	20	50
Pair 13 (NY)	Network (13N)	400	60	80	20	0	80
	Non-Network (13C)	400	60	70	20	0	80
Pair 14 (NY)	Network (14N)	400	50	80	20	0	100
	Non-Network (14C)	500	50	80	10	0	70
Pair 15 (NY)	Network (15N)	300	50	40	60	0	70
	Non-Network (9C)	400	40	40	50	0	70

Note. FRPL is free or reduced-price lunch. School demographics from the 2010–11 Common Core of Data (CCD). To ensure school confidentiality, enrollment is rounded to the nearest 100 students and percentages are rounded to the nearest 10%.

**Details on Specific School Pairs:**

Schools 4N and 5N are located in the same district, and we were able to recruit only a single non-network school in this district. The students in this non-network school were matched to students in both School 4N and School 5N. Schools 7N1 and 7N2 were associated with the same deeper learning network and resided on the same campus. Because the schools were small in size, we combined the students attending them and treated them as single network school in the analyses, comparing it with 7C.

Due to small sample sizes, Schools 10C1 and 10C2 (non-network schools) were combined and treated as a single non-network school. Both non-network schools served populations that were similar to Schools 10N and 11N (network schools), which were associated with the same deeper learning network. The propensity scores for Pairs 10 and 11 were based on a combined sample that included both Schools 10N and 11N (network schools) and Schools 10C1 and 10C2 (non-network schools), because of the limited sample size within the individual network and non-network schools. After the propensity scores had been computed, however, Pairs 10 and 11 were considered separate pairs for the purposes of the impact analysis.

<sup>a</sup> Due to missing data in the 2010–11 CCD, demographic information for this school come from the 2011–12 CCD, and free or reduced-price lunch information for this school came from 2011–12 enrollment data from the California Department of Education, 2011–12.

**B. Student Samples**

In each matched pair of schools, the study focused on four student cohorts. To account for preexisting differences between students attending network and non-network schools in our analyses, we restricted the sample to students who had data on Grade 8 characteristics, including middle school state standardized test scores, in the available district extant data (described in Section III.C). This requirement restricted our sample to students who attended a district school in Grade 8, so our results may not generalize to students who attended a school in our sample in Grade 9 but attended a

nondistrict middle school. The progression of these four cohorts through high school and after high school and the timing of key project activities are illustrated in Exhibit 2.3.

**Exhibit 2.3. Study Timeline and Expected Academic Progression of Participating Grade 9 Cohorts**

Study Timeline	Academic Year	Cohort 1	Cohort 2	Cohort 3	Cohort 4
Original study (Reports 1–3)	2007–08	9			
	2008–09	10	9		
	2009–10	11	10	9	
	2010–11	12	11	10	9
	2011–12	AHS1	12	11	10
	2012–13 <sup>a</sup>	AHS2	AHS1	12	11
	2013–14	AHS3	AHS2	AHS1	12
Updated graduation and college enrollment outcomes	2014–15	AHS4	AHS3	AHS2	AHS1
	2015–16	AHS5	AHS4	AHS3	AHS2
Follow-up study	2016–17	AHS6	AHS5	AHS4	AHS3
	2017–18	AHS7	AHS6	AHS5	AHS4
	2018–19	AHS8	AHS7	AHS6	AHS5
	2019–20 <sup>b</sup>	AHS9	AHS8	AHS7	AHS6

Note. AHSX refers to the number of years after expected high school graduation.

<sup>a</sup> Participants consented to participate in the study and administration of high school survey.

<sup>b</sup> Administration of follow-up survey.

Because students from Cohort 1 and Cohort 2 had already graduated from high school by the time of our original primary data collection in spring 2013, only students from Cohort 3 and 4 (who were in Grade 11 or 12 at the time) were consented to participate in primary data collection. The analyses for Report 6 were therefore based on students in Cohort 3 and Cohort 4.

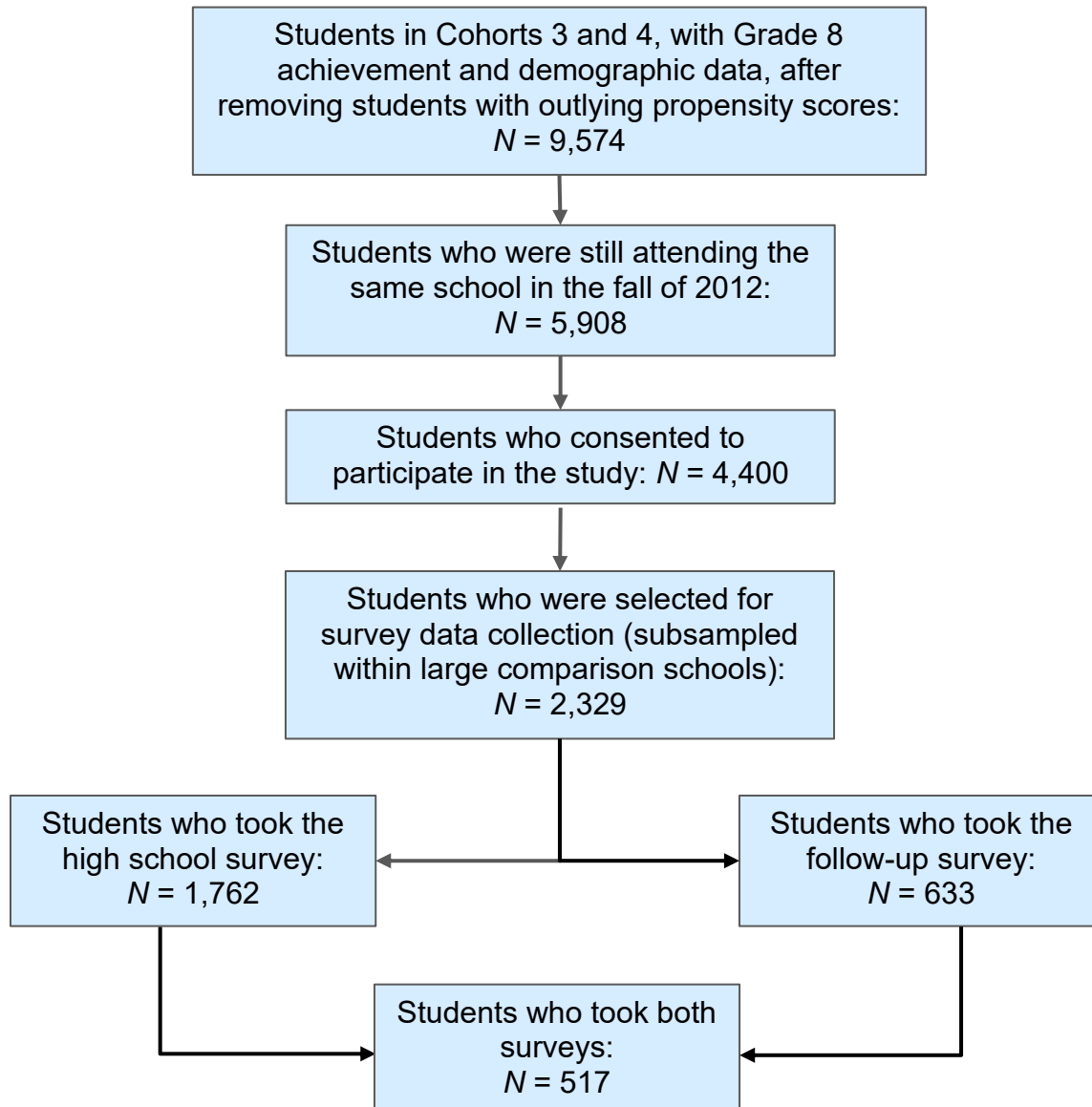
**Sampling for survey data collection.** For primary data collection, our goal was to collect data from a total of 260 students within each school pair (65 Grade 11 students and 65 Grade 12 students in the network and non-network schools). We selected student samples for primary data collection based on propensity score quintiles to ensure we were sampling similar groups of students in each pair of schools. (For more information regarding the calculation of propensity scores, see Section IV.A.) The propensity score quintiles were defined based on the distribution of network students’ estimated propensity scores—the conditional probability of being assigned to the treatment condition (network school enrollment) given a set of observable covariates (Rosenbaum & Rubin, 1983). To ensure that the students we sampled in matched non-network and network schools had similar background characteristics, we excluded non-network school students whose estimated propensity scores fell outside the region of “common support,” which is loosely defined as the range of propensity scores of students who enrolled in the matched network school. In other words, we excluded students in non-network schools from the top propensity score stratum if they had unusually high propensity scores and from the lowest stratum if they had unusually low propensity scores.



Within each school pair, we sampled all consented students from network schools. However, because non-network schools in California tended to be larger in size, we subsampled consented students from these schools by randomly selecting students based on their propensity score quintile and the number of network students in the quintile. As a result, selected samples of network and non-network students had similar distributions of propensity scores within each matched pair of schools. Because the propensity scores reflect student background characteristics, the selected samples of network and non-network students also had similar characteristics.

Exhibit 2.4 illustrates the sample selection process. The study began with 9,574 study participants who (a) entered Grade 9 in 2009–10 or 2010–11 (i.e., Cohort 3 or Cohort 4), (b) had nonmissing Grade 8 demographic and achievement data, and (c) had propensity scores that fell within the region of common support. Approximately 62% of these students (5,908 students) were still enrolled in the same high school in fall 2012, when the study team collected consent forms, and 4,400 participants consented to participate in the study. Sampling procedures resulted in a sample of 2,329 study participants who were selected to take a high school and follow-up surveys. Finally, as we describe in Section III.B, a high school survey administered in spring 2013 achieved a response rate of 76% (1,762 respondents), and a follow-up survey administered in summer 2019 achieved a response rate of 27% (633 respondents). In total, 517 study participants responded to both surveys.

**Exhibit 2.4. Number of Students From the Initial Grade 9 Sample to the Data Collection Sample (Cohorts 3 and 4)**



*Note.* As described in Exhibit 2.2, three non-network schools (School 4C, School 10C, and School 11C) were each included in two different school pairs so that they could be matched with two different network schools. Therefore, the counts presented in Exhibit 2.3 and the remaining exhibits include the non-network students within these schools twice.

### III. Data Sources and Measures

To address the research questions for this follow-up study, we collected survey data from study participants. An overview of the data sources, including coverage across schools and students, is provided in Exhibit 3.1. In addition to outcome data, student-level administrative records from the participating districts were collected for all students who entered Grade 9 in each of the four study cohorts in order to estimate propensity scores and include covariates in outcome models.

**Exhibit 3.1. Outcome Data Sources and Sample Sizes**

Data Source	Description	Sample	Number of Schools	Response Rate
Follow-up survey	Measures participants' college experiences and civic engagement and workforce outcomes	Students in Cohorts 3 and 4 with parental consent, and who were subsampled for data collection	22 schools, 11 school pairs	27% overall 29% network students 26% non-network students
High school survey	Measures students' self-reported opportunities to engage in deeper learning, as well as interpersonal and intrapersonal outcomes	Students in Cohorts 3 and 4 with parental consent, and who were subsampled for data collection	22 schools, 11 school pairs	76% overall 80% network students 73% non-network students

#### A. Follow-Up Survey

The research team developed the follow-up survey in collaboration with experts in the field in civic engagement, college experiences, and workforce outcomes. The survey included several items asking participants about their frequency of participation in community service and political activities, perceptions of their preparation for college and their college experiences, and their employment outcomes and their perceptions of their current or most recent job. The research team conducted two focus groups with young adults between the ages of 20 and 25 to ensure that the length and language in the survey were age appropriate and well understood.

The follow-up survey was administered starting in summer 2019, approximately 6 and 5 years after students' expected high school graduation for participants in Cohorts 3 and 4, respectively. Mailings invited study participants to take an online survey using a unique login, and postcards were sent to participants periodically as a reminder to take the survey. In September, hardcopy surveys were mailed to study participants who had not yet taken the online survey. After 6 months of survey administration, a total of 562 participants took the survey online and 71 mailed a hardcopy survey to the study team. In total, 633 study participants responded to the follow-up survey, for a response rate of 27.2%.

Below, we provide the survey items for the participant outcomes that we examine in Report 6 along with an explanation for how we measured each outcome. Because we observed that very few survey respondents participated in civic activities with great frequency during the previous year, for these outcomes, all respondents who reported engaging in the activity at least once during the past year were classified as experiencing the outcome.

**Survey Items for Civic Engagement Outcomes**

**Beliefs About the Value and Importance of Community Service**

(Source: Listed beside each question in the table that follows.)

Cronbach’s alpha: .86

Please rate your level of agreement with the following statements. [*Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree*]

Getting involved in improving my local community is important to me. ( <i>Kahne et al., 2007</i> )
I have a responsibility to help improve the lives of others beyond those in my local community. ( <i>Original</i> )
There are charitable or other nonprofit groups or causes that I care deeply about. ( <i>Kahne et al., 2007</i> )
My own personal involvement in charitable or other nonprofit groups or causes helps make a real difference in solving the problems I see. ( <i>Lopez et al., 2006</i> )

**Outcome measure:** The research team averaged responses to the four items in this item set so that the resulting scale ranged from 1 (Strongly disagree) to 5 (Strongly agree).

**Beliefs About the Value and Importance of Political Participation**

(Source: Listed beside each question in the table that follows.)

Cronbach’s alpha: .87

Please rate your level of agreement with the following statements. [*Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree*]

Being informed about political candidates and issues is important to me. ( <i>Ingels et al., 2005</i> )
I have a responsibility to participate in our country’s democracy. ( <i>Lopez et al., 2006</i> )
My personal involvement in political activities can make a difference in helping shape our country’s laws and government. ( <i>Original</i> )
I almost always express my opinions on social and political issues. ( <i>Original</i> )
It is important for people to speak out when an injustice has occurred. ( <i>Pancer et al., 2007</i> )
I really care about the reasons people have for their political views. ( <i>Original</i> )
I believe I can make a positive difference for society by expressing my opinion on political and social issues. ( <i>Original</i> )

**Outcome measure:** The research team averaged responses to the seven items in this item set so that the resulting scale ranged from 1 (Strongly disagree) to 5 (Strongly agree).

**Attended a Meeting or Volunteered Time for a Charitable or Nonprofit Cause**

(Source: Adapted from Lopez et al., 2006)

In the past year, how many times have you volunteered your time or participated in the following types of activities? [*None, Once, 2–4 times, 5–10 times, More than 10 times*]

- Attended a meeting, event, or service hosted by a charitable or nonprofit group or cause.
- Volunteered my time for a charitable or nonprofit group or cause to provide a service, complete a task, help someone in need, or help at an event.

**Outcome measure:** All participants who responded *Once, 2–4 times, 5–10 times, or More than 10 times* to either question were given a value of 1. Participants who responded *None* to both questions were given a value of 0.

### *Donated Money Toward or Helped Raise Money for a Charity*

(Source: Adapted from Lopez et al., 2006)

In the past year, have you helped raise money for any charitable or other nonprofit groups or causes by [*Yes or No*]

- Donating your own money?
- Helping raise funds from others to support a group or cause?

**Outcome measure:** All participants who responded *yes* to at least one question was given a value of 1, and participants who responded *No* to both questions were given a value of 0.

### *Participated in an In-Person or Online Political Protest, March, or Demonstration*

(Source: adapted from Lopez et al., 2006)

In the past year, how many times have you done the following? [*Never, Once, 2–4 times, 5–10 times, More than 10 times*]

- Taken part in an in-person political protest, march, or demonstration
- Taken part in an online political protest using social media (e.g., deciding to not stream music from an artist because you disagree with their views and actions)

**Outcome measure:** All participants who responded *Once, 2–4 times, 5–10 times, or More than 10 times* to either question were given a value of 1, and participants who responded *None* to both questions were given a value of 0.

### *Signed a Political Petition*

(Source: Adapted from Lopez et al., 2006 and Kahne & Bowyer, 2019)

In the past year, how many times have you done the following? [*Never, Once, 2–4 times, 5–10 times, More than 10 times*]

- Signed a political petition (e.g., on paper or online through e-mail, Facebook, or an online forum)

**Outcome measure:** All participants who responded *Once, 2–4 times, 5–10 times, or More than 10 times* were given a value of 1. Participants who responded *None* were given a value of 0.

### *Intentionally Did Not Buy a Product or Service Because They Disliked the Values or Conduct of the Company*

(Source: Adapted from Lopez et al., 2006)

In the past year, how many times have you done the following? [*Never, Once, 2–4 times, 5–10 times, More than 10 times*]

- Made an intentional decision NOT to buy a product because you disliked the values or conduct of the company that produces it

**Outcome measure:** All participants who responded *Once, 2–4 times, 5–10 times, or More than 10 times* were given a value of 1. Participants who responded *None* were given a value of 0.

### *Used Social Media to Express Their Opinion in Protest of a Company*

(Source: Adapted from Kahne & Bowyer, 2019)

In the past year, how many times have you done the following? [*Never, Once, 2–4 times, 5–10 times, More than 10 times*]

- Used social media or other online forums and posts to express your opinion in protest of a specific corporation, company, or business for something they did.

**Outcome measure:** All participants who responded *Once, 2–4 times, 5–10 times, or More than 10 times* were given a value of 1. Participants who responded *None* were given a value of 0.

### *Voted in the 2016 (Presidential) or 2018 (Midterm) Election*

- Did you vote in the last presidential election (November 8, 2016) [*Yes or No*]
- Did you vote during the last national midterm election (November 6, 2018)? [*Yes or No*]

**Outcome measure:** All participants who responded *Yes* to at least one of these questions were given a value of 1. Participants who responded *No* to both of these questions were given a value of 0.

### *Sometimes or Almost Always Express Their Opinions When Social-Political Issues Come Up in Conversations With Their Friends*

(Source: Cohen & Kahne, 2015)

What is your typical response when social-political issues come up when communicating with friends? [response options below]

- Not applicable. Social-political topics have never come up.
- I avoid these discussions by leaving the room or social media site or changing the subject.
- I listen and follow the discussion or read the exchanges but don't say anything.
- I sometimes express my opinion.
- I almost always express my opinion.

**Outcome measure:** All participants who responded *I sometimes express my opinion* or *I almost always express my opinion* were given a value of 1. Participants who provided a different response were given a value of 0.

### Survey Items for Workforce Outcomes

#### Employment and College Attendance at the Time Participants Took the Follow-Up Survey

- Are you attending a postsecondary program in fall 2019? [*Yes* or *No*]
- What is your current employment status? Employment refers to any paid work or running your own business.
  - I am currently employed.
  - I am not currently employed but have been employed in the past.
  - I have never been employed.

**Outcome measures:** To measure employment at the time participants responded to the follow-up survey, all participants who responded *I am currently employed* were given a value of 1. Participants who responded *I am not currently employed but have been employed in the past* or *I have never been employed* were given a value of 0.

To create binary indicators capturing participants' employment and college enrollment status, we considered responses to both questions above. For each of these indicators, participants who did not meet the specified condition and had nonmissing data on the employment status question were given a value of 0.

- **Employed and not attending college:** Participants who responded *I am currently employed* and who responded *No* to the question asking whether they were attending a postsecondary program in fall 2019 were given a value of 1.
- **Employed and attending college:** Participants who responded *I am currently employed* and who responded *Yes* to the question asking whether they were attending a postsecondary program in fall 2019 were given a value of 1.
- **Attending college and not employed:** Participants who responded *I am not currently employed but have been employed in the past* or *I have never been employed* and who responded *Yes* to the question asking whether they were attending a postsecondary program in fall 2019 were given a value of 1.
- **Not employed and not attending college:** Participants who responded *I am not currently employed but have been employed in the past* or *I have never been employed* and who responded *No* to the question asking whether they were attending a postsecondary program in fall 2019 were given a value of 1.

#### Whether They Have Ever Been Unemployed for a Period of at Least 3 Months

Since leaving high school or college, have you ever been unemployed for a period of 3 months or longer when you were actively seeking paid work? [*Yes* or *No*]



**Outcome measure:** All participants who responded *Yes* were given a value of 1. Participants who responded *No* were given a value of 0. All study participants were asked this survey question, even if they were not currently employed or had never been employed.

### *Whether They Were Somewhat or Very Satisfied With Their Job*

Overall, how satisfied are you with your job? [*Very dissatisfied, Somewhat dissatisfied, Neither satisfied nor dissatisfied, Somewhat satisfied, Very satisfied*]

**Outcome measure:** All participants who responded *Somewhat satisfied* or *Very satisfied* were given a value of 1, and participants who responded *Very dissatisfied, Somewhat dissatisfied, or Neither satisfied nor dissatisfied* were given a value of 0. Participants who responded that they were currently employed were asked about their current job. Participants who responded that they were not currently employed but have been employed in the past were asked about their most recent job. Participants who had never been employed were not asked this question.

### *Whether the Job Was Aligned With (or a Step on the Path Toward) Their Career Goals*

(Source: National Center for Education Statistics, 2012)

- How well does/did your job relate to your long-term career goals—that is, the job you hope to have someday when you are established in your desired career or profession?
  - It aligns/aligned well with my long-term career goals.
  - It is/was a step on the path toward my long-term career goals.
  - It is/was not related to my long-term career goals.
  - I have not established long-term career goals yet.

**Outcome measure:** All participants who responded *It aligns/aligned well with my long-term career goals* or *It is/was a step on the path toward my long-term career goals* were given a value of 1. Participants who responded *It is/was not related to my long-term career goals* or *I have not established long-term career goals yet* were given a value of 0. Participants who responded that they were currently employed were asked about their current job. Participants who responded that they were not currently employed but have been employed in the past were asked about their most recent job. Participants who had never been employed were not asked this question.

### *Whether Their Earned Income Was at Least \$30,000 in the Previous Year*

Select the category that best represents your earned income in the last year before taxes and deductions:

- I did not earn income in the last year.
- Less than \$19,999
- \$20,000 to \$29,999
- \$30,000 to \$39,999
- \$40,000 to \$49,999
- \$50,000 to \$74,999



- \$75,000 to \$99,999
- \$100,000 to \$149,999
- \$150,000 or more

**Outcome measure:** All participants who responded *I did not earn income in the last year*, *Less than \$19,999*, or *\$20,000 to \$29,999* were given a value of 1. Participants who provided a different response were given a value of 0. All study participants were asked this survey question even if they were not currently employed or had never been employed.

### *Job Characteristics*

We used information from the following survey questions to descriptively illustrate the job characteristics of participants who attended network and non-network schools in Report 6 (see Box 6 in the main report). For each of the following survey questions, participants who responded that they were currently employed were asked about their current job. Participants who responded that they were not currently employed but have been employed in the past were asked about their most recent job. Participants who had never been employed were not asked these questions.

- How many paid jobs do you currently have/did you have the last time you were employed?
  - One
  - Two
  - Three or more
- During a typical week, how many hours do/did you work for pay? If you have/had more than one job, add up how many hours you usually work(ed) each week for all your jobs.
  - Less than 20 hours per week
  - Between 20 and 34 hours per week
  - Between 35 and 45 hours per week
  - More than 45 hours per week
- What field of work are you in?<sup>3</sup>
  - Business or finance
  - Mathematics, computer science, or information technology
  - Architecture or engineering
  - Life or physical science
  - Social science
  - Community or social service

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<sup>3</sup> Response options for this survey question generally align with categories commonly used by the [Bureau of Labor Statistics](#).

- Law
  - Educational instruction or librarian
  - Arts, design, entertainment, sports, or media
  - Health care
  - Protective service (e.g., police officer, firefighter)
  - Food preparation or service
  - Building or grounds cleaning and maintenance
  - Sales or retail
  - Office or administrative support
  - Farming, fishing, or forestry
  - Construction or mineral extraction
  - Installation, maintenance, or repair
  - Transportation or material moving
  - Military
  - Other
- How much do you agree with the following statements about your job? In my job, it is/was important to... [*Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree*]

*(Source: Listed beside each question in the table that follows.)*

Think creatively and generate innovative ideas. <i>(Original)</i>
Solve new and complex problems. <i>(NSSE, 2021)</i>
Think analytically and critically. <i>(NSSE, 2021)</i>
Stay engaged in my work. <i>(Original)</i>
Stick with a task until it is/was done. <i>(Original)</i>
Work collaboratively with colleagues. <i>(Bowen &amp; Bok, 1998)</i>
Assume a leadership role within a team or group. <i>(Bowen &amp; Bok, 1998)</i>
Communicate my ideas and opinions clearly and effectively when speaking. <i>(Bowen &amp; Bok, 1998)</i>
Communicate my ideas and opinions clearly and effectively in writing. <i>(Bowen &amp; Bok, 1998)</i>
Get my work done on time. <i>(Original)</i>
Keep my work organized. <i>(Original)</i>

## **B. High School Survey**

As part of the survey development process, the high school survey was piloted in six network schools in spring 2012. To test the reliability of survey constructs and the survey administration processes, we subsampled 30 consented students from each of the high school grades to take the student survey. Items were added, dropped, or reworded based on findings from the pilot.

For the research study, high school surveys were administered in spring 2013, when respondents were expected to be in Grades 11 and 12. At most schools, surveys were administered by members of the research team.<sup>4</sup> All schools were given the option of administering an online survey; paper surveys were administered in 18 schools and students took online surveys in four schools. The student survey included items (listed below) that measured opportunities to experience instruction focused on different dimensions of deeper learning and the competencies expected to result from exposure to deeper learning. For the follow-up study, we focus on six measures of opportunities for deeper learning and eight measures of students' interpersonal and intrapersonal competencies that were measured in the high school survey. A complete version of the high school survey can be found [here](#).

Each survey item had four response options. For example, the items that measured opportunities for deeper learning had the following response options: None of my classes within the academic year (coded 0); one of my classes within the academic year (coded 1); two of my classes within the academic year (coded 2); and three or more of my classes within the academic year (coded 3). We estimated construct scores from the item-level responses with an ordered logit Rasch model (Yen, 1986), implemented with the WINSTEPS software package. The resulting Rasch scale scores are in the logit metric and have both negative and positive values. The value of zero is anchored to the average difficulty of the items included in the scale. In general, a student with a positive score tended to respond favorably (i.e., choosing the highest or second highest response option) on average. A student with a negative score tended to respond negatively (i.e., choosing the lowest or second lowest response option) on average. The sample on which we calculated Rasch scores for each scale was restricted to students with missing data for no more than half of the items within the scale. Less than 5 percent of students within each school had missing data on each of the scales, with the exception of one non-network school, in which a technological glitch during survey administration caused all items from the first half of the survey to be deleted.<sup>5</sup> High school survey measures used in Report 6 were standardized among the full sample of survey respondents so that the resulting scales had a mean of 0 and a standard deviation of 1.

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<sup>4</sup> AIR staff were not present for survey administration in one school due to scheduling issues. In addition, students in two schools who were not present for the first survey administration were asked to complete the online survey on their own time. AIR staff were not present for these makeup sessions.

<sup>5</sup> In one of the four schools in which the survey was administered online, a computer glitch deleted students' responses to the first half of the survey as soon as they advanced to the second half of the survey. We corrected the computer issue and asked students to retake the student survey, but only a small number of students retook the survey.

### Opportunities for Deeper Learning

#### Opportunities for Complex Problem Solving

(Source: Adapted from the National Survey of Student Engagement [NSSE], 2011)

Rasch reliability: .90; Cronbach's alpha: .93

In how many of your English, math, science, and social studies classes this year do you do the following? [None of my classes, One of my classes, Two of my classes, Three or more of my classes]

I analyze an idea, experience, theory, or story by examining its various parts.
I combine many ideas and pieces of information into something new and more complex.
I judge the value and reliability of an idea.
I use ideas or concepts from one class to help solve a problem in another classroom.

#### Opportunities for Complex Problem Solving in English Language Arts

(Source: Consortium on Chicago School Research [CCSR], 2007)

Rasch reliability: .83; Cronbach's alpha: .89

Think about your English classes you've taken this year. In these classes, how often do you do the following? [Never, Some of the time, Most of the time, All of the time]

I discuss my point of view about something I've read.
I discuss connections between what we are reading in class and real-life people or situations.
I discuss how culture, time, or place affects an author's writing.
I explain how writers use tools like symbolism and metaphor to communicate meaning.
I improve a piece of writing as a class or with partners.
I debate the meaning of what we are reading in class.

#### Opportunities for Complex Problem Solving in Mathematics

(Source: CCSR, 2007)

Rasch reliability: .71; Cronbach's alpha: .76

Now just think about your math classes this year. In these classes, how often do you do the following? [Never, Some of the time, Most of the time, All of the time]

I write a few sentences to explain how I solved a math problem.
I write a math problem for other students to solve.
I discuss possible solutions to problems with other students.
I use math to solve real-world problems.
I solve a problem with multiple steps that take more than 20 minutes.

### Opportunities for Complex Problem Solving in Science

(Source: Original)

Rasch reliability: .86; Cronbach's alpha: .91

Now just think about your science classes you've taken this year. In these classes, how often do you do the following? [*Never, Some of the time, Most of the time, All of the time*]

I form hypotheses by asking questions and defining problems.
I create physical models representing scientific ideas.
I plan and carry out experiments.
I interpret data and explain what the results mean.
I use equations to help me analyze data or solve a problem.
I use data to support a hypothesis or argument.
I am required to judge the value and quality of information.

### Opportunities for Creative Thinking

(Source: Original)

Rasch reliability: .79; Cronbach's alpha: .88

Still think about your English, math, science, and social studies classes this school year. For how many of these classes is each statement true? [*None of my classes, One of my classes, Two of my classes, Three or more of my classes*]

I am encouraged to come up with new and different ideas.
I need to think of original solutions to problems.
I am asked to come up with new ways to do things.
I am challenged to create new ideas.
I have to use my imagination.

### Opportunities to Communicate

(Source: Original, based on the Common Core State Standards)

Rasch reliability: .83; Cronbach's alpha: .90

How many of your teachers (in your core academic subjects) this year ask you to do the following? [*None of my classes, One of my classes, Two of my classes, Three or more of my classes*]

I write for different purposes (for example, to explain or to persuade).
I write for different audiences.
I write and revise a piece of writing through multiple drafts.

I use technology and the Internet to write and get feedback on our writing (for example, on a message board or blog).
I write what I want in a journal, diary, or blog at least once a week.
I lead a group or class discussion.
I share my opinions in a class discussion.
I give presentations with visual aids, such as pictures, videos, charts, or graphs.
I give presentations.
I give presentations for different types of people, such as other students, parents, or people outside of school.
I discuss how well other students present their ideas in presentations.
I use information from different types of sources, such as videos, pictures, graphs, charts, and presentations.

*Opportunities to Collaborate*

(Source: Various, listed beside each question in the table that follows)

Rasch reliability: .69; Cronbach’s alpha: .93

In how many of your core academic classes this year do you do each of the following? [None of my classes, One of my classes, Two of my classes, Three or more of my classes]

I work with other students on projects during class. (NSSE, 2011)
I work on assignments with my classmates outside of class. (NSSE, 2011)
I work in groups of two to six students. (New York City, 2011)
I need to work with others to do well in class. (Original)
Students review and discuss each other’s work. (Akey, 2006)
Students help each other learn. (Akey, 2006)
Students ask questions and give feedback when others present their work in class. (Akey, 2006)
Students review what they’ve learned with one another. (Akey, 2006)
Students speak about their work in front of the class. (Akey, 2006)

*Opportunities for Interdisciplinary Learning*

(Source: Listed beside each question in the table that follows)

Rasch reliability: .78; Cronbach’s alpha: .82

Still thinking about your English, math, science, and social studies classes this year, how often do you do the following? [Never, Some of the time, Most of the time, All of the time]

I work on a project that combines more than one subject (for example, science and literature). <i>(Original)</i>
I put together ideas or concepts from different subjects for assignments or discussions. <i>(NSSE, 2011)</i>
I attend a class that two teachers from different subjects teach together (for example, a math teacher and a science teacher). <i>(Buck Institute for Education [BIE], 2007)</i>
I use ideas or concepts from one class to help solve a problem in another class. <i>(Original)</i>

### Opportunities for Real-World Connections

*(Source: Various, listed beside each question in the table that follows)*

Rasch reliability: .84; Cronbach's alpha: .89

Regarding the work you do for your core academic classes (such as English, math, science, and social studies) this year, in how many classes does the following happen? [*None of my classes, One of my classes, Two of my classes, Three or more of my classes*]

I make observations or collect data outside of the classroom for assignments. <i>(BIE, 2007)</i>
I interview or get information from family or community members. <i>(BIE, 2007)</i>
We connect what we are learning to life outside the classroom. <i>(CCSR, 2007)</i>
I work on helping solve real-world problems. <i>(CCSR, 2007)</i>
I find information for a project from sources outside of school. <i>(Original)</i>
We discuss how someone could use something we learned in school in a real job. <i>(Pace &amp; Kuh, 1998)</i>
I can apply what I learn in class to my life outside of school. <i>(Walker &amp; Fraser, 2005)</i>
I am able to pursue topics that interest me. <i>(Walker &amp; Fraser, 2005)</i>
I work with real-world examples in class work. <i>(Original)</i>

### Deeper Learning Competencies

#### Academic Engagement

*(Source: Listed beside each question in the table that follows.)*

Rasch reliability = .74; Cronbach's alpha = .77

Regarding your core academic classes (English, math, science, and social studies) this year, to what extent do you agree with the following statements? [*Strongly disagree, Disagree, Agree, Strongly agree*]

The topics we are studying are interesting and challenging. <i>(CCSR, 2007)</i>
I am usually bored by classes or activities. <i>(CCSR, 2007)</i>
I usually look forward to classes or activities. <i>(CCSR, 2007)</i>

Sometimes I get so interested in my work I don't want to stop. (CCSR, 2007)
I often count the minutes until class ends. (CCSR, 2007)
I always prepare for class. (Tinio, 2009)
I ask questions when I don't understand the lesson. (Tinio, 2009)
I actively participate in group activities. (Tinio, 2009)
I am usually distracted by my classmates. (Tinio, 2009)
I cut class when I'm bored. (Tinio, 2009)

**Collaboration Skills**

(Source: Listed beside each question in the table that follows)

Rasch reliability = .83; Cronbach's alpha = .91

Now think about the group work you do for your classes. How often are the following statements true about you? [Never or almost never true, Sometimes true, Usually true, Always or almost always true]

When I work with a group...

I tell the other members of my group when I think they are doing a good job. (Huang et al., 2010)
I make sure to be prepared and bring needed materials. (Original)
I remember to do my part of a group project without being reminded. (Original)
I finish my part of a group project on time. (Original)
I help keep my group focused. (Original)
I share my ideas with the group. (Original)
I help my group figure out and fix any problems we face. (Original)
I pay attention when my teammates talk. (Original)
I consider everyone's ideas. (Original)
I learn from other people in my group. (Original)

**Creative Thinking**

(Source: Original)

Rasch reliability: .77; Cronbach's alpha: .84

How often are the following statements true about you? [Never or almost never true, Sometimes true, Usually true, Always or almost always true]

I am able to come up with new and different ideas.
I like to think of original solutions to problems.
I come up with new ways to do things.
I am an original thinker.
I have a better imagination than my friends.



*Perseverance*

(Source: Duckworth & Quinn, 2009)

Rasch reliability = .79; Cronbach's alpha = .88

How often are the following statements true about you? [*Never or almost never true, Sometimes true, Usually true, Always or almost always true*]

I overcome setbacks to achieve important goals.
I am a hard worker.
I finish what I begin.
I achieve goals even if they take a long time.
I do a careful and thorough job. (Original)

*Locus of Control*

(Source: Levenson, 1981).

Rasch reliability = .73; Cronbach's alpha: .83

How often are the following statements true about you? [*Never or almost never true, Sometimes true, Usually true, Always or almost always true*]

I believe that whether or not I get to be a leader depends mostly on my ability.
When I make plans, I am almost certain to make them work.
I believe that I can pretty much determine what will happen in my life.
I believe that when I get what I want, it's usually because I worked hard for it.
I believe that my life is determined by my own actions.

*Motivation to Learn*

(Source: Pintrich & DeGroot, 1990)

Rasch reliability: .75; Cronbach's alpha: .81

Think about the work you are doing in your classes this year. How often are the following statements true about you? [*Never or almost never true, Sometimes true, Usually true, Always or almost always true*]

It is important for me to learn what is being taught in my classes.
I think that what I am learning in my classes is useful for me to know.
I think what I am learning in my classes is interesting.
I prefer class work that is challenging so I can learn new things.
I try to learn from my mistakes in my schoolwork.

**Self-Management**

(Source: Listed beside each question in the table that follows.)

Rasch reliability = .81; Cronbach’s alpha = .85

How often are the following statements true about you? [*Never or almost never true, Sometimes true, Usually true, Always or almost always true*]

I set goals for doing better in school. ( <i>Culture of Excellence &amp; Ethics Assessment, 2019</i> )
I make a to-do list every day. ( <i>Xue &amp; Sun, 2011</i> )
I make schedules to help myself finish tasks on time. ( <i>Xue &amp; Sun, 2011</i> )
I finish my tasks on time. ( <i>Xue &amp; Sun, 2011</i> )
I get all the help I can to help me reach my goals. ( <i>Xue &amp; Sun, 2011</i> )
I set long-term goals for myself. ( <i>Xue &amp; Sun, 2011</i> )
I can find the information I need to learn on my own. ( <i>Pace &amp; Kuh, 1998</i> )
I feel good about my ability to learn whatever I want or need to know. ( <i>Learning Point Associates, 2012</i> )
I can learn effectively on my own. ( <i>NSSE, 2011</i> )
I feel like I am in charge of what I learn. ( <i>Learning Point Associates, 2012</i> )

**Self-Efficacy**

(Source: *Chen et al., 2001*)

Rasch reliability = .84; Cronbach’s alpha = .91

How often are the following statements true about you? [*Never or almost never true, Sometimes true, Usually true, Always or almost always true*]

I believe I will be able to reach my goals.
I know I can complete difficult tasks.
I believe I can do whatever I decide to do.
I believe I will be able to overcome challenges.
I know I can do many different things well.
Compared to most other people, I can do most tasks very well.
Even when things are tough, I can perform quite well.

### C. Student Background Data (Extant Data)

We obtained student-level administrative records from the participating districts containing data on student characteristics measured in Grade 8 and Grade 9. We used the record data to identify students to be included in our samples (i.e., first-time Grade 9 students) and to incorporate covariates in our analyses. Our study schools were located in multiple school districts, so consistent data were not available for all study schools. However, because school pairs were constructed within a district, we had the same set of student background characteristics for the two schools in any given pair.<sup>6</sup> Exhibit 3.2 lists the student background data we received from districts and details how many school pairs had each data element. As the exhibit indicates, we had two measures of student socioeconomic background: parents’ education and students’ free or reduced-price lunch status. In impact models, we used a single measure of low socio-economic status. Among schools with information about eligibility for free or reduced-price lunch, students who were eligible for free or reduced-price lunch were identified as low socioeconomic status. Among schools with information on parental education, students with parents with a high school education or less were identified as low socioeconomic status.

**Exhibit 3.2. Description of Student Background Data From Extant District Data**

Measure	Description	Number of School Pairs With Available Data
Female	Dichotomous indicator of students’ gender	15
Race/ethnicity	Dichotomous indicators created for African American, Hispanic, white, Asian, and “other” races	15
Parents’ education	Categorical measure of parental education—specifically, the highest level of education obtained by either parent—using the following categories: some high school, high school diploma, some college, college degree, higher degree (above BA), and declined to report parents’ education (varies slightly by district)	6
Free or reduced-price lunch status	Dichotomous indicator of whether student was eligible for the free or reduced-price lunch program, typically in Grade 8	9
English learner students	Dichotomous indicator of whether the student was identified as an English learner, typically in Grade 8	15
Individualized education program	Dichotomous indicator of whether the student had an individualized education program, typically in Grade 8	15
Prior achievement in English language arts	Standardized test score in English language arts prior to entering high school, from Grade 8	13
Prior achievement in mathematics	Standardized test score in mathematics prior to entering high school, from Grade 8, including indicators for math test subject where relevant; standardized using the state mean and standard deviation for each year and grade level	13

<sup>6</sup> One pair of schools contained a network and a non-network school in neighboring districts. The data elements available across the two districts were very similar.

## IV. Analytic Methods

In this section, we describe the calculation of analysis weights as well as the analysis methods employed to estimate (a) the impact of attending deeper learning network schools (impact analyses) and (b) the relationships between students’ opportunities for deeper learning and deeper learning competencies in high school and longer-term outcomes (correlational analyses).

### A. Weighting

We applied weights to statistical analyses to reflect two features of the study’s design. First, we applied propensity score weights to account for measured pre–high school characteristics (including both demographic characteristics and Grade 8 achievement test scores) related to the decision to enroll in a deeper learning high school and likely related to student outcomes. Second, we applied a “survey weight” that accounted for attrition during high school, sampling, and survey nonresponse. We calculated two different survey weights: The first weight accounted for nonresponse to the follow-up survey (for analyses of outcomes measured in the follow-up survey). The second weight accounted for nonresponse in *both* the high school survey *and* the follow-up survey (for analyses examining associations between measures in both surveys). Survey weights were estimated as inverse probability weights so that results for the students from whom we collected data would be representative of the students who entered sampled network and non-network schools in Grade 9.

Exhibit 4.1 presents summary statistics for all of the individual weights as well as the combined analytic weight. Because civic engagement and workforce outcomes were measured using the follow-up survey, the analytic weight applied to impact analyses for these outcomes (Weight 4 in Exhibit 4.1) is the product of the propensity score weight (Weight 1) and the survey weight for the follow-up survey (Weight 2). Because study participants must have responded to both the high school survey and the follow-up survey to be included in analyses using measures from both surveys, Weight 3 in Exhibit 4.1 was applied to these analyses. Each of these weights are described in greater detail after the table.

**Exhibit 4.1. Descriptive Statistics for Individual and Combined Weights for Analyses of Student Survey Data, for Network and Non-Network Students**

		<i>N</i>	Mean	SD	Min	Max
Weight 1. Propensity score weight for school selection	Network	250	1.00	0.00	1.00	1.00
	Non-network	383	0.31	0.38	0.01	2.67
Weight 2. Survey weight, follow-up survey	Network	250	6.10	4.85	1.46	33.88
	Non-network	383	16.66	8.95	2.36	61.01
Weight 3. Survey weight, high school and follow-up surveys	Network	203	7.16	5.05	1.58	28.12
	Non-network	314	19.11	11.27	2.17	73.60

		N	Mean	SD	Min	Max
Weight 4. Analysis weight (Weight 1 × Weight 2)	Network	250	6.10	4.85	1.46	33.88
	Non-network	383	4.84	6.88	0.12	79.37

Note. SD = standard deviation. Weight 4, which is the analytic weight for impact analyses of workforce and civic engagement outcomes, is equal to the product of Weight 1 and Weight 2. Weight 3 was applied to analyses examining relationships between high school opportunities and deeper learning competencies and civic engagement and workforce outcomes.

### Propensity Score Weights (Weight 1): Weighting for Student Selection Into Network Schools

Students were not randomly assigned to attend network and non-network schools, so network and non-network students may not have had equivalent characteristics when entering high school. These preexisting student differences mean that any claims about a network school’s effects on longer-term outcomes could be biased if based on direct comparisons between network and non-network students. To account for these preexisting differences, we used inverse probability of treatment weighting (IPTW), which adjusts the comparison student sample to be more representative of the network student sample based on measured student background characteristics. The weights we applied to analyses for this follow-up study were the same weights that were used in the original *Study of Deeper Learning*. Assuming the measured student background characteristics accurately capture the important preexisting differences between network and non-network students, IPTW allows us to obtain valid estimates about what network students would have experienced if they had attended the non-network school.

IPTW is a propensity score-based method for selection bias adjustment (Hirano et al., 2003). A student’s propensity score ( $p_i$ ) is her or his predicted probability of attending a network school instead of a non-network school, given the measured student characteristics ( $X_i$ ). To estimate propensity scores, we estimated separate logistic regression models for each school pair ( $j$ ) and student cohort ( $k$ ):

$$\ln\left(\frac{p_{ijk}}{1 - p_{ijk}}\right) = \beta_{0jk} + \beta_{1jk}X_{ijk},$$

where  $X_{ijk}$  represents the student characteristics listed in Exhibit 3.2 that were available for a given school pair. The estimated propensity scores were then used to calculate IPTWs for study participants using the equation:

$$w1_{ijk} = T_{ijk} + (1 - T_{ijk})\frac{p_{ijk}}{1 - p_{ijk}},$$

where  $T_{ijk}$  equals 1 for students attending a network school and 0 for students attending a non-network school. Using this equation, the IPTW had a value of 1 for all students attending a network school. In contrast, the comparison group was weighted to represent the network group (with study participants with larger propensity scores exhibiting larger weights) to facilitate estimation of the average treatment effect on the treated.

### **Survey Weights (Weight 2 and Weight 3): Weighting for Student Persistence, Consent, and Survey Nonresponse**

For this study, we selected a subsample of study participants to take the high school survey. We reached out to the same subsample of study participants for the follow-up survey in 2019. To be selected for active data collection, study participants must have (a) persisted in the same high school up until fall 2012 and (b) consented to participate in active data collection during the 2012–13 school year. Both attrition (i.e., leaving the high school prior to fall 2012) and nonconsent had the potential to bias the study sample, as the characteristics of students who consented to participate in the study may not resemble the characteristics all students who entered these Grade 9 cohorts. To limit the number of survey respondents from large non-network high schools, no more than 260 consented students from each school pair were sampled for survey data collection.<sup>7</sup> Finally, nonresponse to the high school and follow-up surveys had the potential to introduce bias into the analytic sample because study participants were excluded from analyses if they had missing data on relevant survey measures. Approximately 76% of sampled students responded to the high school survey, whereas 27% of sampled students responded to the follow-up survey.

Aligning with prior research on survey response bias, descriptive statistics indicated that the sample of students who responded to surveys differed in measured characteristics from the full sample of cohort students entering Grade 9. To account for sample attrition, nonconsent, sampling, and nonresponse, we estimated survey weights for the follow-up survey (Weight 2) using Grade 8 demographic characteristics and achievement test scores. A second survey weight (Weight 4), which was applied to analyses exploring relationships between opportunities for deeper learning and deeper learning competencies during high school and workforce and civic engagement outcomes, took into account participants' probability of responding to both the high school survey and the follow-up survey.

To calculate survey weights, we used generalized boosted regression (McCaffrey et al., 2004) to estimate a student's probability of providing relevant survey data. This method iteratively tries various combinations of student background covariates to predict the probability of being in the analysis sample. The algorithm searches for the combination of covariates that minimizes the differences in measured characteristics between students in the analysis sample and those who were not when the latter are weighted by the inverse probability of being in the analysis sample. We used the *twang* package in the *R* statistical program to execute the generalized boosted regression. Following the recommendations set forth by the package authors (Ridgeway et al., 2013), we set the interaction depth to 4, shrinkage to 0.0005, and bagging to 0.50. Along with the student characteristics listed in Exhibit 3.2, a dichotomous indicator for cohort and school fixed effects were included in statistical models estimating survey weights.

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<sup>7</sup> Because network schools were smaller in size than non-network schools, we administered the survey to all consented network students. In school pairs in which network schools had fewer than 130 consented students within Grade 11 or Grade 12, we oversampled consented students in the matched non-network schools to achieve the target sample size of 260 students within each matched school pair. In large non-network schools with large numbers of consented students, we sampled consented students based on their propensity score strata (quintiles defined by the distribution of the matched network school).

Survey weights were calculated as the inverse of the estimated probabilities of being in the two analytic samples. In other words, study participants with lower probabilities of responding to the survey(s) were given greater weight in impact analyses. With these weights, students in the analytic samples were weighted to represent the cohorts entering Grade 9.

In Exhibit 4.2, we present descriptive statistics for (a) the original cohort sample of students who entered Grade 9 in sampled schools in 2009–10 and 2010–11, (b) the subsample of participants who responded to the follow-up survey, and (c) the subsample of participants who responded to both the high school and the follow-up survey. We provide descriptive information about the analysis samples both before and after applying the survey weights. In general, the application of survey weights reduced observed differences between the subsample of participants who responded to the follow-up (and high school) survey and the original sample of Grade 9 students.

**Exhibit 4.2. Student Characteristics in Cohort and Analytic Samples, Before and After Applying Survey Weights**

Student Characteristic	Cohort Sample Mean (n = 9,574)	Respondents to the Follow-Up Survey (n = 633)		Respondents to Both the High School and follow-up surveys (n = 517)	
		Unweighted Mean	Weighted Mean (Weight 2)	Unweighted Mean	Weighted Mean (Weight 3)
Average standardized Grade 8 English language arts test score <sup>a</sup>	0.00	0.44	0.12	0.45	0.11
Average standardized Grade 8 mathematics test score <sup>a</sup>	0.00	0.28	0.06	0.28	0.07
Percent member of the younger cohort	50.0%	52.4%	49.2%	51.8%	49.2%
Percent female	50.6%	62.4%	53.3%	62.7%	54.3%
Percent Black	13.2%	10.0%	10.5%	9.9%	11.2%
Percent Hispanic	52.0%	49.6%	53.7%	50.5%	52.9%
Percent White	22.6%	30.8%	25.3%	29.6%	24.3%
Percent Asian/other race	12.0%	9.5%	10.3%	9.9%	11.2%
Percent low socioeconomic status <sup>b</sup>	52.1%	48.3%	54.7%	48.9%	54.4%
Percent students with an individualized education program	7.7%	4.4%	5.8%	3.1%	5.1%
Percent English learner students	25.5%	21.3%	24.5%	22.2%	25.8%

Note. Test scores were standardized within the original cohort sample by state and Grade 9 cohort. Excludes one pair because the comparison school does not have either measure of socioeconomic status.

<sup>a</sup> Excludes two school pairs without prior achievement data.

<sup>b</sup> Includes students who qualified for free or reduced-price lunch or whose parents had a high school education.



### ***Analysis Weight (Weight 4)***

To estimate the impact of attending a deeper learning network school on civic engagement and workforce outcomes, and for these impacts to generalize to the incoming cohorts of Grade 9 students at participating schools, it was necessary to apply both the propensity score weight and the survey weight.<sup>8</sup> A convenient property of inverse probability weighting is that different weights can be combined through multiplication (see, for example, Morgan & Todd, 2008). Therefore, the analysis weight that we applied to impact analyses was equal to the product of the propensity score weight (Weight 1) and the survey weight (Weight 2).

To assess the quality of the analysis weight, we examined the degree to which network and non-network students had similar student background characteristics after applying the analysis weight. A comparison of average student background characteristics before and after applying the analysis weight (Weight 4) to the impact study sample is provided in Exhibit 4.3. For each characteristic, we report the standardized mean difference (SMD). For a given characteristic, the SMD is defined by the following equation:

$$SMD = \frac{\bar{x}_n - \bar{x}_c}{sd_p},$$

where  $\bar{x}_n$  is the mean among participants who attended network schools,  $\bar{x}_c$  is the mean among participants who attended non-network schools, and  $sd_p$  is the unweighted, pooled standard deviation for the original Grade 9 population. Exhibit 4.3 shows that several of the SMDs that exceeded 0.25 standard deviations, which is a common threshold for baseline imbalance (What Works Clearinghouse, 2017), before applying weights were reduced to below 0.25 standard deviations after applying weights. However, differences in the distribution of participants across Grade 9 cohorts and across racial/ethnic categories still exceeded 0.25 standard deviations after applying the analysis weight. To account for imbalance that remains after weighting, we controlled for these covariates in the outcome models (discussed below).

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<sup>8</sup> We did not apply the propensity score weight to correlational analyses because these analyses did not directly compare the outcomes of students who attended network schools and students who attended non-network schools.



**Exhibit 4.3. Network and Non-Network Student Characteristics for the Impact Analysis Sample for Civic Engagement and Workforce Outcomes, Before and After Weighting: Cohorts 3 and 4**

Student Characteristics	Before Applying Weights			After Applying Weights		
	Non-Network Mean	Network Mean	SMD	Non-Network Mean	Network Mean	SMD
Propensity scores	0.235	0.282	0.27	0.353	0.311	-0.24
Average standardized Grade 8 English language arts test score <sup>a</sup>	0.508	0.292	-0.22	0.016	-0.120	-0.14
Average standardized Grade 8 mathematics test score <sup>a</sup>	0.349	0.149	-0.20	-0.016	-0.179	-0.16
Percent member of the younger cohort	49.9%	58.0%	0.20	44.2%	56.7%	0.30
Percent female	65.4%	62.8%	-0.07	60.8%	55.7%	-0.13
Percent Black	8.8%	13.2%	0.28	10.3%	14.8%	0.26
Percent Hispanic	50.0%	48.8%	-0.03	67.2%	57.5%	-0.25
Percent White	28.6%	30.4%	0.05	17.6%	22.3%	0.18
Percent Asian/other race	12.4%	7.6%	-0.33	4.8%	5.3%	0.06
Percent low socioeconomic status <sup>b</sup>	51.5%	48.5%	-0.07	60.0%	60.4%	0.01
Percent students with an individualized education program	3.8%	5.6%	0.25	7.7%	6.8%	-0.08
Percent English learner students	16.5%	24.0%	0.28	27.0%	32.5%	0.16

*Note.* SMD = standardized mean difference. Adjusted group averages for students who attended non-network schools were calculated using a single-level ordinary least-squares regression model with school pair fixed effects. Test scores were standardized within the original cohort sample by state and Grade 9 cohort. Results are based on the sample of 633 study participants who responded to the follow-up survey (250 who attended network schools and 383 who attended non-network schools).

<sup>a</sup> Excludes two school pairs without prior achievement data.

<sup>b</sup> Includes students who qualified for free or reduced-price lunch or whose parents had a high school education. Excludes one pair because the comparison school does not have either measure of socioeconomic status.

## **B. Statistical Models**

### ***Impact Models***

To estimate the effects of enrolling in a deeper learning network school instead of a non-network school, we estimated hierarchical linear models with study participants nested within school pairs.<sup>9</sup> The analysis method is considered doubly robust (Funk et al., 2011) because it accounts for observed differences in network and non-network students in two ways: (a) through propensity score weighting and (b) through regression-based covariate adjustment. If either of the two adjustment methods accurately accounts for student differences, then we can obtain valid estimates of the network school's effect. However, because the schools in this study were purposefully selected to be moderately or high implementing (according to their networks) and to meet other criteria, the results cannot be generalized to all schools within the participating networks.

Impact analyses used the following weighted ordinary least-squares regression model:

$$Y_{ij} = \beta_{0j} + \beta_{1j}T_{ij} + \beta_{3j}X_{ij} + e_{ij},$$

where  $Y_{ij}$  is a given participant outcome for student  $i$  in school pair  $j$ ;  $T_{ij}$  is a dichotomous indicator for whether the student enrolled in the network school ( $T_{ij}= 1$ ) or the non-network school ( $T_{ij} = 0$ ) in the fall of Grade 9; and  $X_{ij}$  is a vector of available student background characteristics listed in Exhibit 3.2, as well as a dichotomous indicator for incoming Grade 9 cohort.<sup>10</sup> All student background characteristics were group-mean centered within school pairs. Finally, for impact analyses of civic engagement and workforce outcomes, we applied the analysis weight (Weight 4), so the estimated effect is representative of students who enrolled in a network school in the fall of Grade 9.

The main parameter of interest is  $\beta_{1j}$ , which is the effect of enrolling in a network school instead of the matched non-network school. Using hierarchical linear models for binary outcomes, estimates of  $\beta_{1j}$  can be interpreted as percentage point differences between groups. Estimates for scales from the follow-up survey (e.g., beliefs about the value and importance of community involvement) are on the original 1 to 5 scale (1 = strongly disagree to 5 = strongly agree).

### ***Correlational Analysis Models***

The impact model described above was modified to estimate relationships between opportunities for deeper learning and deeper learning competencies in high school and civic engagement and workforce outcomes. We estimated relationships between high school measures and outcome measures using hierarchical linear models with study participants nested within the schools they entered in Grade 9. These models applied the survey weight that accounted for response to both the high school survey and the follow-up survey (Weight 3), and they controlled for student background characteristics that were group-mean centered around school means. We estimated a separate model for each high school survey measure ( $M_{ij}$ ), and high school survey measures

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<sup>9</sup> To assist with the interpretation of findings, we estimated hierarchical linear models for all binary and continuous outcomes. Alternative analyses used hierarchical generalized linear models with a logit link function for binary outcomes. The results of these analyses do not differ substantively from the analyses presented in study reports.

<sup>10</sup> A single cohort indicator is included in impact models for civic engagement and workforce outcomes because only Cohorts 3 and 4 participated in the follow-up survey.

were centered around the school mean. Correlational analyses used the following weighted ordinary least-squares regression model:

$$Y_{ij} = \beta_{0j} + \beta_{1j}M_{ij} + \beta_{2j}X_{ij} + e_{ij}.$$

The main parameter of interest for these models is  $\beta_{1j}$ , which is the relationship between the specified high school survey measure and the longer-term participant outcome. Because we estimated a separate model for each high school measure and for each of 10 civic engagement outcome measures and five workforce outcome measures, we estimated a total of 210 correlational analysis models (see detailed results in Section V).

### **Qualitative Analysis**

The research team systematically analyzed data collected through phone interviews with 20 study participants to identify themes related to respondents' post-high school experiences. We examined responses across specific topic areas (e.g., factors influencing students' career choices, high school experiences that prepared students for college and careers, contributors and barriers to civic engagement). When sufficient numbers of responses were available, we compared responses from participants who attended network schools and participants who attended non-network schools to identify possible differences.

### **Handling Missing Data**

Because students must have had Grade 8 administrative data to be included in the original *Study of Deeper Learning*, few study participants have missing data on individual background characteristics. However, there are two covariates for which all students within specific school pairs were missing data. First, because two school pairs primarily served recent immigrants to the United States, and because these students were exempt from participating in state testing, prior achievement test scores were missing for participants within two school pairs. In addition, because one district did not provide data for either parents' education or eligibility for free or reduced-price lunch, data on socioeconomic status are missing for participants within one school pair. For these covariates, we imputed a value of 0 for the school pairs with missing data. Because analyses account for the clustering of participants within schools or school pairs, and a missing data indicator would be collinear with school pair membership, models did not include dummy variables for missing data.

For analyses of civic engagement and workforce outcomes, we observed little missing data on outcome variables within the analysis sample of follow-up survey respondents. Across measures of civic engagement, over 98% of survey respondents provided a response to each survey item. Items that measured workforce outcomes related to general experiences (e.g., current employment, unemployment experience) also demonstrated a small amount (less than 2%) of missing data. However, several workforce outcomes only applied to participants who have been employed, and about 3.2% of survey respondents reported that they have never been employed or did not respond to the question about employment status and therefore were not given the opportunity to respond to these questions. For the outcomes of earned income, job satisfaction, and reports that their job aligns with their career goals, over 98% of survey respondents who reported that they have been employed provided a response to each survey item. Because of the small amount of missing data for these outcome measures and because missing values for

workforce outcomes were not missing at random, we did not impute missing outcome data. Analyses included all participants with nonmissing data for each outcome. Sample sizes for each outcome are included with results of impact analyses in Exhibit 5.1 in Section V. Similarly, correlational analyses included only those participants who had nonmissing data on relevant high school survey measures and outcome measures from the follow-up survey. Sample sizes associated with each correlational analysis model are presented with results of correlational analyses in Exhibits 5.2 to 5.15 in Section V.

## V. Detailed Results

In this section, we provide supplemental tables presenting detailed information for the results described in Report 6.

### Exhibit 5.1. The Effect of Attending a Deeper Learning Network School on Civic Engagement and Workforce Outcomes

Outcome	Coefficient	Standard Error	Network Students (Unadjusted)	Comparison Students (Adjusted)	p Value	Sample Size
<i>Civic Engagement Outcomes</i>						
Beliefs about the importance and value of community service	-0.04	0.08	3.58	3.62	.635	632
Beliefs about the importance and value of political participation	0.11	0.09	3.50	3.40	.254	629
Volunteering—attended a meeting or volunteered time in the past year	0.13	0.05	68%	55%	.013	633
Donated own money or helped to raise money for charity in the past year	0.03	0.06	59%	56%	.657	631
Voted in 2016 presidential or 2018 midterm elections	-0.01	0.07	62%	63%	.907	632
Express opinion during political conversations with friends	0.02	0.04	63%	61%	.570	632
Took part in an in-person or online political protest, march, or demonstration	-0.03	0.05	39%	42%	.534	632
Signed a political petition (e.g., on paper or online through e-mail, Facebook, or an online forum)	0.01	0.04	51%	50%	.849	633
Made an intentional decision to not buy a product because you disliked the values or conduct of the company that produces it	-0.10	0.04	54%	64%	.024	631
Used social media or other online forums and posts to express your opinion in protest of a specific corporation, company, or business for something they did	-0.11	0.05	33%	44%	.036	630

Outcome	Coefficient	Standard Error	Network Students (Unadjusted)	Comparison Students (Adjusted)	p Value	Sample Size
<i>Workforce Outcomes</i>						
Employed at the time of the follow-up survey	-0.07	0.03	77%	84%	.022	629
Employed and not attending college	0.03	0.05	57%	54%	.600	629
Employed and attending college	-0.10	0.05	21%	30%	.048	629
Attending college and not employed	0.02	0.02	6%	4%	.250	629
Not employed and not attending college	0.05	0.02	17%	12%	.013	629
Unemployed for 3 or more months	0.03	0.06	43%	40%	.641	624
Job satisfaction	-0.02	0.06	62%	64%	.749	607
Current (or most recent) job aligns with career goals (aligned or a step on the path toward goals)*	0.00	0.05	51%	50%	.926	610
Salary was at least \$30,000	-0.06	0.05	30%	36%	.274	604

Note. All results account for the nesting of students in school pairs and are weighted to account for survey sampling and survey nonresponse. Reported averages for non-network students are based on statistical adjustments that account for differences in background characteristics between groups.

### Exhibit 5.2. Relationships Between Opportunities for Collaboration and Civic Engagement and Workforce Outcomes

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Civic Engagement Outcomes</i>				
Beliefs about community service	0.10	0.06	.094	515
Beliefs about political participation	0.16	0.08	.039	512
Volunteering	0.05	0.02	.041	516
Donating or raising money for charity	0.06	0.03	.042	514
Voting in a national election	0.09	0.03	.002	515
Expressing opinions during political conversations with friends	0.07	0.03	.025	516
Participating in a protest	0.02	0.03	.528	515
Signing a petition	-0.03	0.03	.331	516
Boycotting a product	0.04	0.04	.305	514
Expressing opinion about a product or company	0.08	0.04	.028	514

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Workforce Outcomes</i>				
Employed at the time of the follow-up survey	0.01	0.02	.433	512
Never unemployed	0.00	0.03	.961	508
Job satisfaction	0.01	0.03	.759	494
Job aligns with career goals	0.05	0.02	.021	497
Earned income at least \$30,000	0.03	0.03	.328	492

Note. All results account for the nesting of students in schools and are weighted to account for survey sampling and survey nonresponse. Coefficients for the outcomes “beliefs about community service” and “beliefs about political participation” represent the change on a scale of 1 (strongly disagree) to 5 (strongly agree) resulting from an increase of one standard deviation in the opportunity measure. Coefficients for the remaining outcomes represent the percentage point change in the outcome resulting from an increase of one standard deviation in the opportunity measure.

### Exhibit 5.3. Relationships Between Opportunities for Communication and Civic Engagement and Workforce Outcomes

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Civic Engagement Outcomes</i>				
Beliefs about community service	0.06	0.05	.213	487
Beliefs about political participation	0.13	0.06	.037	484
Volunteering	0.04	0.02	.072	488
Donating or raising money for charity	0.08	0.03	.005	486
Voting in a national election	0.06	0.03	.037	487
Expressing opinions during political conversations with friends	0.08	0.03	.005	488
Participating in a protest	0.02	0.02	.326	487
Signing a petition	-0.02	0.03	.558	488
Boycotting a product	0.04	0.03	.116	486
Expressing opinion about a product or company	0.07	0.04	.115	486
<i>Workforce Outcomes</i>				
Employed at the time of the follow-up survey	0.02	0.02	.240	485
Never unemployed	0.02	0.02	.504	482
Job satisfaction	0.04	0.02	.072	468
Job aligns with career goals	0.03	0.03	.450	471
Earned income at least \$30,000	0.07	0.03	.005	466

Note. All results account for the nesting of students in schools and are weighted to account for survey sampling and survey nonresponse. Coefficients for the outcomes “beliefs about community service” and “beliefs about political participation” represent the change on a scale of 1 (strongly disagree) to 5 (strongly agree) resulting from an increase of one standard deviation in the opportunity measure. Coefficients for the remaining outcomes represent the percentage point change in the outcome resulting from an increase of one standard deviation in the opportunity measure.

**Exhibit 5.4. Relationships Between Opportunities for Complex Problem Solving and Civic Engagement and Workforce Outcomes**

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Civic Engagement Outcomes</i>				
Beliefs about community service	0.08	0.05	.079	487
Beliefs about political participation	0.18	0.05	.000	484
Volunteering	0.04	0.02	.027	488
Donating or raising money for charity	0.05	0.03	.064	486
Voting in a national election	0.07	0.02	.001	487
Expressing opinions during political conversations with friends	0.06	0.03	.069	488
Participating in a protest	0.04	0.02	.009	487
Signing a petition	0.04	0.03	.128	488
Boycotting a product	0.11	0.02	.000	486
Expressing opinion about a product or company	0.05	0.03	.075	486
<i>Workforce Outcomes</i>				
Employed at the time of the follow-up survey	0.04	0.01	.006	485
Never unemployed	0.03	0.03	.323	482
Job satisfaction	0.02	0.03	.444	468
Job aligns with career goals	0.06	0.03	.043	471
Earned income at least \$30,000	0.08	0.02	.000	466

Note. All results account for the nesting of students in schools and are weighted to account for survey sampling and survey nonresponse. Coefficients for the outcomes “beliefs about community service” and “beliefs about political participation” represent the change on a scale of 1 (strongly disagree) to 5 (strongly agree) resulting from an increase of one standard deviation in the opportunity measure. Coefficients for the remaining outcomes represent the percentage point change in the outcome resulting from an increase of one standard deviation in the opportunity measure.

**Exhibit 5.5. Relationships Between Opportunities for Creative Thinking and Civic Engagement and Workforce Outcomes**

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Civic Engagement Outcomes</i>				
Beliefs about community service	0.14	0.05	.008	510
Beliefs about political participation	0.16	0.05	.001	507
Volunteering	0.03	0.03	.249	511
Donating or raising money for charity	0.07	0.04	.048	509
Voting in a national election	0.06	0.02	.021	510
Expressing opinions during political conversations with friends	0.07	0.02	.003	511
Participating in a protest	0.01	0.03	.641	510
Signing a petition	-0.04	0.02	.095	511
Boycotting a product	0.05	0.03	.060	509
Expressing opinion about a product or company	0.08	0.02	.000	509



Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Workforce Outcomes</i>				
Employed at the time of the follow-up survey	0.01	0.01	.332	507
Never unemployed	0.01	0.03	.683	503
Job satisfaction	0.03	0.02	.116	489
Job aligns with career goals	0.10	0.04	.009	492
Earned income at least \$30,000	0.04	0.02	.059	487

Note. All results account for the nesting of students in schools and are weighted to account for survey sampling and survey nonresponse. Coefficients for the outcomes “beliefs about community service” and “beliefs about political participation” represent the change on a scale of 1 (strongly disagree) to 5 (strongly agree) resulting from an increase of one standard deviation in the opportunity measure. Coefficients for the remaining outcomes represent the percentage point change in the outcome resulting from an increase of one standard deviation in the opportunity measure.

**Exhibit 5.6. Relationships Between Opportunities for Interdisciplinary Learning and Civic Engagement and Workforce Outcomes**

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Civic Engagement Outcomes</i>				
Beliefs about community service	0.12	0.05	.020	512
Beliefs about political participation	0.17	0.05	.000	509
Volunteering	0.07	0.03	.007	513
Donating or raising money for charity	0.09	0.03	.006	511
Voting in a national election	0.04	0.03	.161	512
Expressing opinions during political conversations with friends	0.06	0.03	.043	513
Participating in a protest	0.03	0.03	.338	512
Signing a petition	-0.02	0.02	.215	513
Boycotting a product	0.08	0.02	.000	511
Expressing opinion about a product or company	0.07	0.03	.011	511
<i>Workforce outcomes</i>				
Employed at the time of the follow-up survey	0.03	0.02	.077	509
Never unemployed	-0.01	0.03	.649	505
Job satisfaction	0.02	0.03	.574	491
Job aligns with career goals	0.07	0.04	.119	494
Earned income at least \$30,000	0.01	0.03	.823	489

Note. All results account for the nesting of students in schools and are weighted to account for survey sampling and survey nonresponse. Coefficients for the outcomes “beliefs about community service” and “beliefs about political participation” represent the change on a scale of 1 (strongly disagree) to 5 (strongly agree) resulting from an increase of one standard deviation in the opportunity measure. Coefficients for the remaining outcomes represent the percentage point change in the outcome resulting from an increase of one standard deviation in the opportunity measure.

### Exhibit 5.7. Relationships Between Opportunities for Real-World Connections and Civic Engagement and Workforce Outcomes

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Civic Engagement Outcomes</i>				
Beliefs about community service	0.15	0.03	.000	511
Beliefs about political participation	0.18	0.04	.000	508
Volunteering	0.07	0.02	.001	512
Donating or raising money for charity	0.08	0.02	.000	510
Voting in a national election	0.04	0.03	.162	511
Expressing opinions during political conversations with friends	0.06	0.03	.012	512
Participating in a protest	0.02	0.03	.404	511
Signing a petition	-0.04	0.02	.100	512
Boycotting a product	0.06	0.02	.004	510
Expressing opinion about a product or company	0.08	0.03	.012	510
<i>Workforce Outcomes</i>				
Employed at the time of the follow-up survey	0.03	0.01	.028	508
Never unemployed	0.02	0.02	.487	504
Job satisfaction	0.06	0.02	.005	490
Job aligns with career goals	0.08	0.03	.010	493
Earned income at least \$30,000	0.02	0.02	.342	488

Note. All results account for the nesting of students in schools and are weighted to account for survey sampling and survey nonresponse. Coefficients for the outcomes “beliefs about community service” and “beliefs about political participation” represent the change on a scale of 1 (strongly disagree) to 5 (strongly agree) resulting from an increase of one standard deviation in the opportunity measure. Coefficients for the remaining outcomes represent the percentage point change in the outcome resulting from an increase of one standard deviation in the opportunity measure.

### Exhibit 5.8. Relationships Between Academic Engagement and Civic Engagement and Workforce Outcomes

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Civic Engagement Outcomes</i>				
Beliefs about community service	0.15	0.06	.009	486
Beliefs about political participation	0.18	0.08	.015	483
Volunteering	0.05	0.02	.031	487
Donating or raising money for charity	0.03	0.03	.318	485
Voting in a national election	0.05	0.02	.008	486
Expressing opinions during political conversations with friends	0.02	0.03	.380	487
Participating in a protest	0.01	0.02	.508	486
Signing a petition	0.04	0.03	.139	487
Boycotting a product	0.01	0.02	.587	485
Expressing opinion about a product or company	0.00	0.03	.896	485

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Workforce Outcomes</i>				
Employed at the time of the follow-up survey	0.00	0.01	.869	484
Never unemployed	0.06	0.03	.032	481
Job satisfaction	0.01	0.02	.534	467
Job aligns with career goals	0.03	0.03	.227	470
Earned income at least \$30,000	0.06	0.03	.094	465

Note. All results account for the nesting of students in schools and are weighted to account for survey sampling and survey nonresponse. Coefficients for the outcomes “beliefs about community service” and “beliefs about political participation” represent the change on a scale of 1 (strongly disagree) to 5 (strongly agree) resulting from an increase of one standard deviation in the deeper learning competency measure. Coefficients for the remaining outcomes represent the percentage point change in the outcome resulting from an increase of one standard deviation in the deeper learning competency measure.

**Exhibit 5.9. Relationships Between Collaboration Skills and Civic Engagement and Workforce Outcomes**

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Civic Engagement Outcomes</i>				
Beliefs about community service	0.01	0.07	.845	486
Beliefs about political participation	0.13	0.07	.056	483
Volunteering	0.02	0.02	.446	487
Donating or raising money for charity	0.04	0.04	.353	485
Voting in a national election	0.04	0.03	.152	486
Expressing opinions during political conversations with friends	0.02	0.03	.493	487
Participating in a protest	0.01	0.04	.743	486
Signing a petition	-0.02	0.03	.496	487
Boycotting a product	0.03	0.03	.387	485
Expressing opinion about a product or company	0.01	0.03	.734	485
<i>Workforce Outcomes</i>				
Employed at the time of the follow-up survey	0.03	0.01	.022	484
Never unemployed	0.05	0.02	.003	481
Job satisfaction	0.02	0.02	.460	467
Job aligns with career goals	0.04	0.04	.244	470
Earned income at least \$30,000	0.03	0.02	.189	465

Note. All results account for the nesting of students in schools and are weighted to account for survey sampling and survey nonresponse. Coefficients for the outcomes “beliefs about community service” and “beliefs about political participation” represent the change on a scale of 1 (strongly disagree) to 5 (strongly agree) resulting from an increase of one standard deviation in the deeper learning competency measure. Coefficients for the remaining outcomes represent the percentage point change in the outcome resulting from an increase of one standard deviation in the deeper learning competency measure.

**Exhibit 5.10. Relationships Between Creative Thinking Skills and Civic Engagement and Workforce Outcomes**

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Civic Engagement Outcomes</i>				
Beliefs about community service	0.03	0.05	.490	482
Beliefs about political participation	0.15	0.06	.011	479
Volunteering	0.05	0.02	.020	483
Donating or raising money for charity	0.04	0.04	.265	481
Voting in a national election	0.05	0.03	.134	482
Expressing opinions during political conversations with friends	0.05	0.02	.027	483
Participating in a protest	0.05	0.03	.066	482
Signing a petition	-0.01	0.02	.806	483
Boycotting a product	0.06	0.03	.011	481
Expressing opinion about a product or company	0.07	0.03	.017	481
<i>Workforce Outcomes</i>				
Employed at the time of the follow-up survey	-0.01	0.02	.596	480
Never unemployed	0.01	0.02	.613	477
Job satisfaction	0.02	0.02	.309	463
Job aligns with career goals	0.07	0.03	.056	466
Earned income at least \$30,000	0.05	0.03	.058	461

Note. All results account for the nesting of students in schools and are weighted to account for survey sampling and survey nonresponse. Coefficients for the outcomes “beliefs about community service” and “beliefs about political participation” represent the change on a scale of 1 (strongly disagree) to 5 (strongly agree) resulting from an increase of one standard deviation in the deeper learning competency measure. Coefficients for the remaining outcomes represent the percentage point change in the outcome resulting from an increase of one standard deviation in the deeper learning competency measure.

**Exhibit 5.11. Relationships Between Locus of Control and Civic Engagement and Workforce Outcomes**

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Civic Engagement Outcomes</i>				
Beliefs about community service	0.19	0.04	.000	513
Beliefs about political participation	0.13	0.10	.194	510
Volunteering	0.04	0.02	.066	514
Donating or raising money for charity	0.04	0.02	.109	512
Voting in a national election	0.06	0.02	.006	513
Expressing opinions during political conversations with friends	0.06	0.03	.021	514
Participating in a protest	0.00	0.03	.937	513
Signing a petition	-0.03	0.02	.038	514
Boycotting a product	-0.01	0.03	.842	512
Expressing opinion about a product or company	0.02	0.02	.292	512

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Workforce Outcomes</i>				
Employed at the time of the follow-up survey	0.03	0.02	.099	510
Never unemployed	0.02	0.01	.135	506
Job satisfaction	0.00	0.02	.932	492
Job aligns with career goals	0.06	0.03	.045	495
Earned income at least \$30,000	0.06	0.02	.013	490

Note. All results account for the nesting of students in schools and are weighted to account for survey sampling and survey nonresponse. Coefficients for the outcomes “beliefs about community service” and “beliefs about political participation” represent the change on a scale of 1 (strongly disagree) to 5 (strongly agree) resulting from an increase of one standard deviation in the deeper learning competency measure. Coefficients for the remaining outcomes represent the percentage point change in the outcome resulting from an increase of one standard deviation in the deeper learning competency measure.

**Exhibit 5.12. Relationships Between Motivation to Learn and Civic Engagement and Workforce Outcomes**

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Civic Engagement Outcomes</i>				
Beliefs about community service	0.07	0.08	.357	484
Beliefs about political participation	0.20	0.08	.021	481
Volunteering	0.04	0.03	.153	485
Donating or raising money for charity	0.07	0.03	.011	483
Voting in a national election	0.05	0.03	.055	484
Expressing opinions during political conversations with friends	0.07	0.03	.035	485
Participating in a protest	0.06	0.04	.115	484
Signing a petition	0.00	0.02	.995	485
Boycotting a product	0.04	0.03	.102	483
Expressing opinion about a product or company	0.03	0.03	.392	483
<i>Workforce Outcomes</i>				
Employed at the time of the follow-up survey	0.03	0.02	.229	482
Never unemployed	0.06	0.02	.000	479
Job satisfaction	0.04	0.03	.081	465
Job aligns with career goals	0.06	0.04	.177	468
Earned income at least \$30,000	0.06	0.02	.008	463

Note. All results account for the nesting of students in schools and are weighted to account for survey sampling and survey nonresponse. Coefficients for the outcomes “beliefs about community service” and “beliefs about political participation” represent the change on a scale of 1 (strongly disagree) to 5 (strongly agree) resulting from an increase of one standard deviation in the deeper learning competency measure. Coefficients for the remaining outcomes represent the percentage point change in the outcome resulting from an increase of one standard deviation in the deeper learning competency measure.

**Exhibit 5.13. Relationships Between Perseverance and Civic Engagement and Workforce Outcomes**

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Civic Engagement Outcomes</i>				
Beliefs about community service	0.08	0.05	.127	483
Beliefs about political participation	0.15	0.07	.040	480
Volunteering	0.07	0.03	.018	484
Donating or raising money for charity	0.03	0.03	.439	482
Voting in a national election	0.04	0.03	.246	483
Expressing opinions during political conversations with friends	0.06	0.03	.083	484
Participating in a protest	0.03	0.04	.500	483
Signing a petition	-0.02	0.03	.510	484
Boycotting a product	0.04	0.03	.247	482
Expressing opinion about a product or company	0.02	0.04	.612	482
<i>Workforce Outcomes</i>				
Employed at the time of the follow-up survey	0.00	0.02	.857	481
Never unemployed	0.03	0.02	.097	478
Job satisfaction	0.00	0.03	.956	464
Job aligns with career goals	0.07	0.03	.044	467
Earned income at least \$30,000	0.02	0.03	.462	462

Note. All results account for the nesting of students in schools and are weighted to account for survey sampling and survey nonresponse. Coefficients for the outcomes “beliefs about community service” and “beliefs about political participation” represent the change on a scale of 1 (strongly disagree) to 5 (strongly agree) resulting from an increase of one standard deviation in the deeper learning competency measure. Coefficients for the remaining outcomes represent the percentage point change in the outcome resulting from an increase of one standard deviation in the deeper learning competency measure.

**Exhibit 5.14. Relationships Between Self-Efficacy and Civic Engagement and Workforce Outcomes**

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Civic Engagement Outcomes</i>				
Beliefs about community service	0.14	0.05	.007	513
Beliefs about political participation	0.09	0.10	.351	510
Volunteering	0.03	0.02	.232	514
Donating or raising money for charity	0.03	0.02	.165	512
Voting in a national election	0.02	0.02	.415	513
Expressing opinions during political conversations with friends	0.07	0.03	.015	514
Participating in a protest	-0.03	0.04	.442	513
Signing a petition	-0.06	0.02	.020	514

Outcome	Coefficient	Standard Error	p Value	Sample Size
Boycotting a product	-0.01	0.02	.653	512
Expressing opinion about a product or company	0.02	0.01	.138	512
<i>Workforce Outcomes</i>				
Employed at the time of the follow-up survey	0.03	0.02	.154	510
Never unemployed	0.00	0.01	.949	506
Job satisfaction	-0.01	0.03	.709	492
Job aligns with career goals	0.02	0.03	.486	495
Earned income at least \$30,000	0.06	0.02	.002	490

Note. All results account for the nesting of students in schools and are weighted to account for survey sampling and survey nonresponse. Coefficients for the outcomes “beliefs about community service” and “beliefs about political participation” represent the change on a scale of 1 (strongly disagree) to 5 (strongly agree) resulting from an increase of one standard deviation in the deeper learning competency measure. Coefficients for the remaining outcomes represent the percentage point change in the outcome resulting from an increase of one standard deviation in the deeper learning competency measure.

**Exhibit 5.15. Relationships Between Self-Management and Civic Engagement and Workforce Outcomes**

Outcome	Coefficient	Standard Error	p Value	Sample Size
<i>Civic Engagement Outcomes</i>				
Beliefs about community service	0.07	0.05	.165	485
Beliefs about political participation	0.14	0.05	.008	482
Volunteering	0.04	0.03	.133	486
Donating or raising money for charity	0.04	0.04	.349	484
Voting in a national election	0.03	0.02	.158	485
Expressing opinions during political conversations with friends	0.08	0.02	.000	486
Participating in a protest	0.03	0.03	.458	485
Signing a petition	-0.02	0.03	.471	486
Boycotting a product	0.02	0.03	.471	484
Expressing opinion about a product or company	0.03	0.03	.189	484
<i>Workforce Outcomes</i>				
Employed at the time of the follow-up survey	0.00	0.02	.846	483
Never unemployed	0.01	0.02	.615	480
Job satisfaction	0.04	0.02	.106	466
Job aligns with career goals	0.07	0.04	.063	469
Earned income at least \$30,000	0.03	0.02	.267	464

Note. All results account for the nesting of students in schools and are weighted to account for survey sampling and survey nonresponse. Coefficients for the outcomes “beliefs about community service” and “beliefs about political participation” represent the change on a scale of 1 (strongly disagree) to 5 (strongly agree) resulting from an increase of one standard deviation in the deeper learning competency measure. Coefficients for the remaining outcomes represent the percentage point change in the outcome resulting from an increase of one standard deviation in the deeper learning competency measure.



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