Creating a Future-Oriented Culture In High Schools

The Impact of the College and Career Readiness Expansion (CCRE) Project

Submitted to Stephen Dackin, Columbus State Community College
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SERVE Center
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Background Information About the SERVE Center

The SERVE Center at the University of North Carolina at Greensboro (UNCG) is a university-based research, development, dissemination, evaluation, and technical assistance center. Its mission is to support and promote teaching and learning excellence in the education community.

Since its inception in 1990, SERVE has been awarded over $200 million in contracts and grants. It has successfully managed 16 major awards, including four consecutive contracts for the Regional Educational Laboratory for the Southeast (REL-SE) funded by the Institute of Education Sciences (IES) at the U.S. Department of Education (USED), and five awards from USED for the National Center for Homeless Education (NCHE). In addition, past SERVE awards include a five-year Technology Grant for Coordinating Teaching and Learning in Migrant Communities, three consecutive contracts as the Eisenhower Consortium for Mathematics and Science Education for the Southeast, and two consecutive Regional Technology in Education Consortium grants.

SERVE is currently hosting a U.S. Department of Education Regional Center, providing services to North Carolina, South Carolina, and Georgia. At the national level, SERVE operates the National Center for Homeless Education (NCHE), USED's technical assistance and information dissemination center in the area of homeless education.

In addition to national-level NCHE activities, SERVE currently conducts research studies and evaluations under grants and contracts with federal, state, and local education agencies. Examples of SERVE's grant-funded research work include three federally funded studies of the impact of Early College High Schools, and a five-year impact study of North Carolina's dual enrollment program. Contract work includes evaluations of five Investing in Innovation (i3) projects, the Winston-Salem/Forsyth County Magnet Program in North Carolina, the Guilford County Schools teacher incentive program (Mission Possible), the USED-funded Bridges to Early Learning Project in South Carolina, and North Carolina's Race to the Top Initiative. *The Program Evaluation Standards, Second Edition* (The Joint Committee on Standards for Educational Evaluation, 1994), the *Guiding Principles for Evaluators* (American Evaluation Association, 2004), and the *What Works Clearinghouse Standards* (Institute of Education Sciences, 2018) guide the evaluation work performed at the SERVE Center.

Section I: Background and Introduction

Columbus State Community College has a long history of working to increase the skills and expertise of the workforce in the Central Ohio area. Through an initiative known as the Central Ohio Compact, Columbus State and a broad range of partners have engaged in a comprehensive set of strategies with the ultimate goal of building a workforce with the education and career-preparatory experiences necessary to support business and industry in the Columbus region.

Within this broader initiative, the College and Career Readiness Expansion (CCRE) project was intended to focus on the K-12 sector. Supported by a $11.6 million grant from the U.S. Department of Education's Investing in Innovation (i3) program, the Career and College Readiness Expansion project sought to support economic development in the Columbus, Ohio area by increasing the number of students who graduated from high school and who were prepared for enrollment and success in postsecondary education. The project did this through implementation of the early college high school model in comprehensive high schools across seven school districts.

The early college high school (early college) model is a research-based strategy to combine aspects of the high school and college experiences. Early colleges have often been implemented as small schools on college campuses with the initiatives primarily led by school districts or non-profit organizations. CCRE experimented with this approach by implementing the model in large comprehensive high schools and by having a community college lead the work. More detail on the model and the supports provided by Columbus State and its partners is provided in the next section.

This report presents final results from the impact study of CCRE. It includes the results of a quasi-experimental study that examined the impact of the project on a core set of student outcomes. It also includes descriptive findings about school-level changes that accompanied CCRE implementation. A summary of the findings can be found in the executive summary that accompanies this report. This longer report includes more detail and begins with an overview of the CCRE model in Section II. Section III presents the technical details of the study methodology. Section IV presents findings regarding changes in participating schools and districts, which is followed by the impacts on students in Section V. The final section of the report discusses implications of this work and presents lessons learned for future replication.

Section II: The CCRE Program

The College and Career Readiness Expansion Project was implemented by Columbus State in conjunction with two key partners: 1) Jobs for the Future (JFF), a national organization focused on policies and interventions supporting the transition to college and career; and 2) the Educational Service Center of Central Ohio (ESC), a regional educational agency that supports initiatives improving school effectiveness and student achievement. Under the CCRE model, Columbus State and its partners worked with seven districts in the Central Ohio area to implement strategies from the early college model within comprehensive high schools. This section describes the CCRE model, the activities that supported the implementation model, and the internal changes Columbus State made to do this project.

II.1. HISTORY OF THE EARLY COLLEGE MODEL

As originally conceptualized, early colleges are small schools that integrate the high school and college experiences. Frequently located on college campuses, early colleges target students who are underrepresented in postsecondary education. Early colleges serve students starting in ninth grade; the goal is to have students graduate in four or five years with a high school diploma and either a postsecondary credential (usually an associate degree) or two years of transferable college credit. Supported by an initial investment by the Bill and Melinda Gates Foundation, the small early college model expanded across the country.

This model has been the subject of two rigorous experimental studies, a 14-year longitudinal experimental study led by the SERVE Center at UNCG and a retrospective experimental study conducted by the American Institutes of Research. These studies found that the early college model had positive impacts on a variety of outcomes, including staying in school, progressing in college preparatory courses, graduating from high school, and enrolling in and graduating from college (Berger et al., 2013; Edmunds, Bernstein, Unlu, Glennie, & Smith, 2013; Edmunds et al., 2012; Edmunds et al., 2017; Edmunds, Willse, Arshavsky, & Dallas, 2013; Haxton et al., 2016; Song & Zeiser, 2019).

II.2. THE CCRE PROJECT SCHOOLS AND STATE CONTEXT

CCRE was implemented in 16 high schools across seven districts. Columbus State aimed to include districts where at least 40% of students were considered economically disadvantaged. In six out of the seven districts, all of the high schools in the district were served by the grant. Four districts were small districts with only one high school. Two of the districts had four high schools with all participating in the project. One district was a large urban district and had four of its high schools participate in the project.

The participating schools and districts represented the geographic diversity of the Central Ohio area. Using NCES locale codes from the Common Core of Data, four (25%) were urban, nine (56%) were suburban, and three (19%) were rural. The CCRE schools differed greatly in size, ranging from a few hundred students to close to 2,000 students with an average of approximately 950 students.

CCRE was implemented within the context of Ohio's College Credit Plus (CCP) policy. Under the policy, which came into effect during the 2015-16 school year, Ohio students in grades 7-12 can apply to any public college or university in Ohio as well as one of several participating private institutions in the state.[1] After meeting the entrance requirements for the institution, such as a qualifying score on a placement test, students may enroll in college courses at public institutions and earn transferable college credit. Transportation for courses that meet face-to-face is not provided, however, creating the necessity for more courses to be offered on high school campuses.

[1]https://www.ohiohighered.org/ccp/faqs

II.3. THE CCRE MODEL

The CCRE model was based on the early college model and included many of the same elements (or Design Principles); a key difference was that CCRE was implemented in comprehensive high schools as opposed to in small schools of choice. Small early colleges expect all of their students to earn an associate degree or two years of college credit at the same time as their high school diploma. Because comprehensive schools serve a wider range of students, the CCRE model had to modify this expectation; however, it had a still ambitious goal of having 90% of high school students graduate with at least three hours of college credit or a career credential.

II.3.1 Design Principles

To support this goal, the expectation was that participating high schools would implement four Early College Design Principles: 1) a Career- and College-Ready Academic Program, 2) a Career and College Headstart, 3) Wraparound Student Supports, and 4) School-level Organizational Practices. Each is briefly described below and in the section that discusses the impact on schools (Section V).

Career- and College-Ready Academic Program

A Career- and College-Ready Academic Program included an academic program of study that allowed almost all students to be prepared for college and to attain college credit while still in high school. To do this, schools were expected to expand opportunities for students to earn at least three college credits. Part of this expansion included the creation of pathways that focused student coursetaking, so that the courses could contribute to a major or a credential. These pathways were intended to include work-based learning experiences when appropriate. Finally, this Design Principle also focused on classroom practices and instructional strategies that enhance rigor, including the Common Instructional Framework (CIF).

Career and College Head Start

The second CCRE Design Principle, Career and College Headstart, focused on providing students with early exposure to the culture and norms of college. This could be done through college readiness skills instruction or through college readiness support activities, such as advising on the courses needed for college and taking students to visit college campuses.

Wraparound Student Supports

The Wraparound Student Supports Design Principle included comprehensive academic supports, social and emotional programming and support, and assistance with college applications and seeking financial aid. These supports involved school staff developing and sustaining relationships with students, providing academic assistance outside of regular class time, and employing systems that identify student needs and suggest targeted interventions. Logistic supports, such as registering for placement tests and courses, navigating college procedures, and understanding how to make use of college resources, also fell within the Wraparound Student Supports Design Principle.

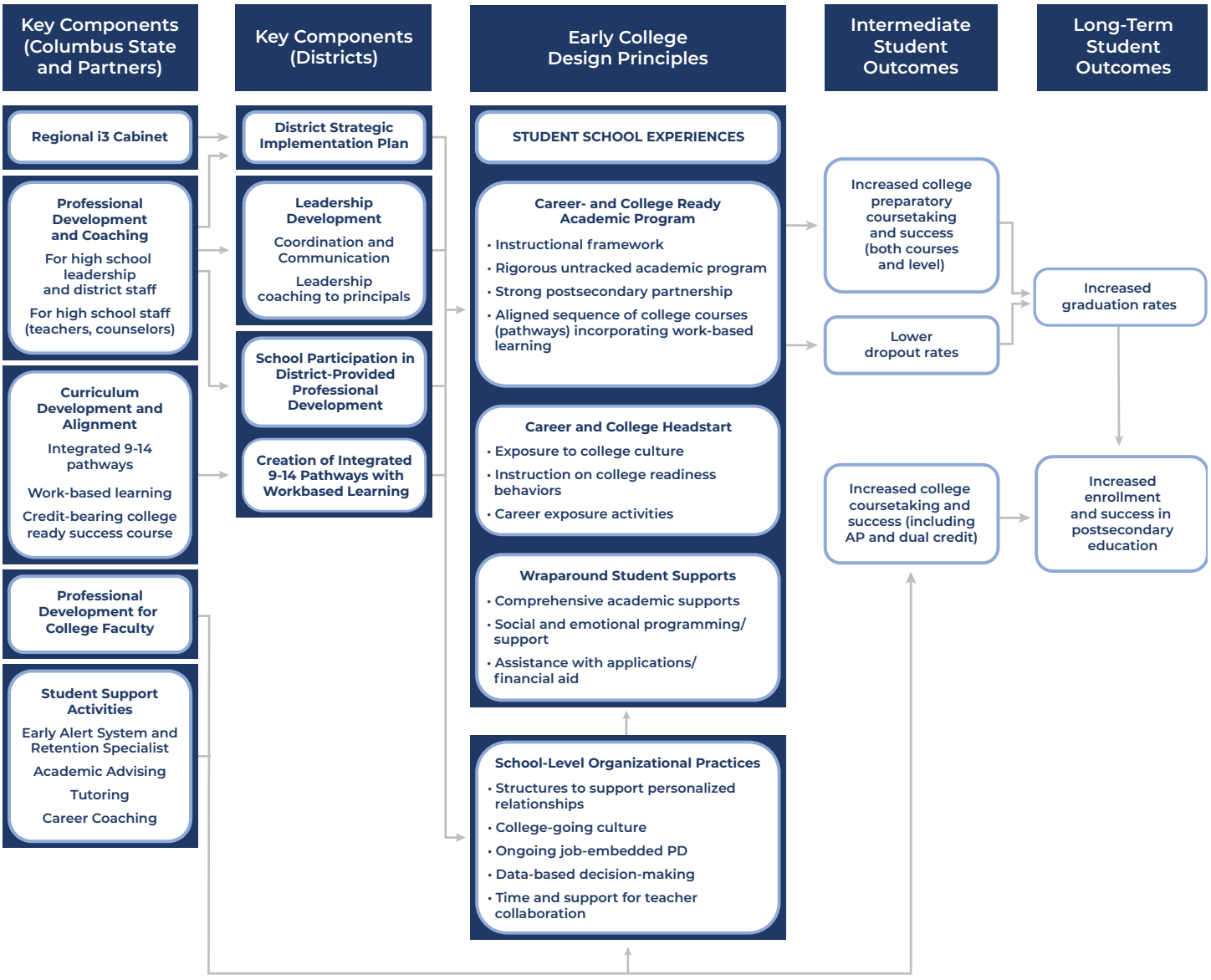
School-Level Organizational Practices

The fourth CCRE Design Principle encompassed school-level practices that needed to be in place to ensure effective implementation of the other Design Principles. These practices entailed: 1) development of structures to support personalized relationships; 2) establishment of a college-going culture; 3) ongoing job-embedded professional development; 4) data-based decision-making; and 5) time and support for teacher collaboration.

II.4. IMPLEMENTATION SUPPORTS

The CCRE model included a suite of services (known as Key Components) intended to support a school's implementation of the Design Principles described above. The following Key Components were the responsibility of Columbus State Community College and its partners, Jobs for the Future and the Educational Service Center of Central Ohio: 1) creation of a regional governance structure, 2) professional development and coaching for district and school staff, 3) curriculum development and alignment, 4) professional development for college faculty, and 5) student support

Figure II-1: College and Career Readiness Expansion Logic Model



activities. The Key Components also included the following activities completed by the local school districts: 6) creation of a strategic implementation plan, 7) leadership coaching for principals and selected administrative staff, 8) professional development for school staff, and 9) creation of integrated 9–14 pathways. Each support is described in more detail below. Figure II-1 presents the relationship between the Key Components, the Design Principles, and the intended student outcomes.

The evaluation team worked with the project staff to identify threshold levels of implementation for each of the program activities (measure of Fidelity of Implementation, or FOI). A summary of FOI for Years 2 and 3 is presented in Appendix A.

Because of challenges due to the COVID-19 pandemic, FOI is not reported for Year 4.

It is important to note that although there were common supports offered to all districts, the nature and content of these supports were often customized to the districts' needs. As one Columbus State staff member noted, "One of the most glaring lessons that I think not just we learned as a project team, but also myself, is that because we have seven very unique partners there needs to be seven very unique approaches to how you work with them."

11.4.1 SUPPORTS PROVIDED BY EXTERNAL PARTNERS

Some of the implementation supports (the Key Components in the first column in Figure 1) were provided by Columbus State and its partners, JFF and the ESC. Highlights of these supports are included below; more detailed resources can be found in the CCRE Toolkit.

Governance Structure

The project's governance structure evolved over the course of the grant. From the beginning, the project had an "i3 Cabinet," which included senior representatives from participating districts, usually the superintendent, and which was designed to guide and make decisions about the overall work of the grant. These meetings were supplemented by Core Team meetings, which included college and district staff, and which focused on the details of implementing project activities. By the final year of the project, there were fewer centralized meetings and more "one-on-one" meetings between Columbus State and one district's representatives to address the districts' specific needs.

Each district was also allowed to hire a project coordinator, an "i3 coordinator," to guide the project's implementation. One district representative commented that they were only able to make as much progress as they did because they had a staff member dedicated to moving the career and college readiness work forward.

Technical Assistance, Professional Development, and Coaching

To support project implementation, the project partners provided a range of capacity development activities to district and school staff. At the beginning of the project, there was an expectation that districts and schools participate in leadership and instructional coaching provided by JFF. As the project evolved, the coaching activities evolved to be more customized to each district and the ESC took on more coaching responsibilities. Leadership coaching involved working with district and school leaders to assist them in implementing the CCRE model; project data showed that 100% of principals reported working with a leadership coach. Instructional coaching emphasized the incorporation of instructional practices expected to prepare students for success in postsecondary education; survey data showed that approximately half of the teachers reported working with an instructional coach.

In addition to the coaching, the districts and schools could participate in a variety of professional development activities, such as workshops or trainings, on a range of topics related to the foci of the grant. Many of these sessions were provided by the ESC. In some cases, professional development included attending conferences (e.g., Success Network Meeting, Big Think Conference 2019); in other cases, professional development happened in district offices or schools. Topics included student success plans, utilizing Naviance (a college and career advising system), College Credit Plus updates, developing apprenticeship plans, and implementing a multi-tiered system of support (MTSS). By the end of the grant, there was an increased emphasis on topics related to sustaining and spreading the work.

Curriculum Development and Alignment

Columbus State provided districts with technical assistance around developing pathways that aligned high school and dual-enrollment courses such that these courses led to a credential or a degree. Over the course of the project, the technical assistance evolved to not only help plan pathway

coursework but also to address issues like finding qualified staff to teach courses, planning for student exploration in pathways, holding collaboration meetings for staff members from different institutions, aligning pathways with other programming in schools, and solving other logistical issues.

Additionally, Columbus State adapted an existing one-credit college success course (COLS 1101) for implementation in the high school environment, making the content more

"high school-centric" and including three projects designed to help students with future planning. Districts further adapted this course to their own needs, with some districts integrating its content into regular high school courses and others offering it as a stand-alone course that would give students college credit.

Columbus State also partnered with districts to create a class called "Third Space English" that built students' college-course readiness. A district coordinator described the effort:

> **"It's called Third Space because it's not the high school space, it's not the college space, but it's a third space, where the high school and college professors and teachers have come together, developed out a semesterized course that really acts as a remedial English course."**
>
> —District Coordinator

At the end of the project, Columbus State had received a waiver from the Ohio Department of Higher Education that allowed them to treat this course as an alternative way of demonstrating readiness for the first level of college English.

Professional Development for College Faculty

Columbus State provided professional development for two groups of college faculty: 1) college instructors who taught dual-enrollment courses, and 2) high school instructors who served as adjunct faculty for the college and taught dual-enrollment courses. Dual enrollment instructors were expected to attend an orientation (when they were new) and additional professional development sessions that were often sponsored by the departments with which they were associated. As shown in Appendix A, very few instructors participated in the expected two sessions of professional development annually. The Columbus State staff noted that the development of the Third Space English (described above) was one of the most effective ways of developing faculty skills.

Student Support Activities

Columbus State provided a variety of student support activities to students taking dual-enrollment courses. First, they had dedicated staff that provided academic advising to students registering for and taking dual-enrollment courses. They started with four on-site advisors (who worked in the high schools), but in an effort to make the advising more sustainable, shifted to fewer advisors with more online support. Second, the college provided each district with data from their Starfish system that monitored how students were doing in their college classes. Each high school had a Starfish contact who was trained in how to use the data. The final support was tutoring for students who were taking college classes. Dual enrollment students could take advantage of all on-site supports at the college, as well as online tutoring services, which was used more frequently by students. All of these Columbus-state supported activities were implemented as intended.

11.4.2 DISTRICT-PROVIDED SUPPORTS

Districts were also expected to provide supports to schools implementing the early college model. These supports are discussed in this section.

Strategic Plans

Each district was expected to create a strategic implementation plan to guide implementation of the Early College Design Principles. At the beginning of the project, Columbus State and the ESC collaborated with

the districts to create a template of program activities and prioritize areas of focus for each implementation year. As the project evolved, the grant moved from expecting a separate plan to having them integrate program activities into their regular district plans.

Leadership Development

As a strategy to ensure sustainability, each district was also supposed to provide professional development to school leadership. Each district had a coordinator who was responsible for managing the project within the district. In addition, each district was expected to provide an average of 12 hours of professional development a year for their principals. In Year 2, 10 of the 16 schools met that threshold and in Year 3, half of the schools received the expected number of hours.

Professional Development for School Staff

Districts were also expected to provide project-relevant professional development to teachers, counselors, and other school staff. These topics varied by district. For example, in one district, the coordinator provided support to teachers on different i3 topics each week. Another district focused on CTE planning and support, while a third emphasized multi-tiered systems of support, curriculum mapping, and data review. The expectation was each school receive at least 12 hours of professional development annually. In Year 2, this threshold was met by 12 out of 16 schools and in Year 3 by 11 schools.

Creation of Pathways

A core activity of the project was creating integrated pathways, which were intended to blend high school and college coursework to lead to a credential or degree program. By the end of the project, each district had designed at least one pathway, although the level of integration of high school and postsecondary coursework varied across districts. There was also an expectation that work-based learning should be integrated into the pathways as appropriate; at the end of the project fewer than half the districts had an explicit, intentional connection between work-based learning activities and stated pathways.

II.4.3 CHANGES MADE AT COLUMBUS STATE

As described above, Columbus State provide an extensive amount of support to the schools. The College took the opportunity to learn from the CCRE Project and reconsider how they interacted with the K-12 system and to reorganize themselves. For example, at the start of the project, there was a dual enrollment office that operated separately from other units at the College. As the number of dual enrollment students increased, the College realized that this work needed to be embedded throughout the normal college processes. Thus, sections like Enrollment Management and Student Services took on a more active role in dual enrollment administration. As one staff member said, "Whether it's admissions, whether it's advising, whatever that might be, it's become an integral part of the College's work." The college also hired a dual enrollment coordinator who reports directly to the Chief Academic Officer.

Columbus State was also able to use the CCRE project to experiment with different models of student support and advising. As a result of the project, Columbus State has also institutionalized practices such as providing data from early alert systems to high schools. More information on how the college has evolved can be found in a policy brief written by Columbus State.

The CCRE evaluation consisted of three different sub-studies: 1) a quasi-experimental impact study using administrative data from the Ohio Department of Education, 2) an annual survey concerning program implementation that was administered to staff in treatment schools and a set of comparison principals, and 3) case studies of six program schools. This section describes the methodology used for each of these three sub-studies.

Section III: Methodology

III.1. ESTIMATING THE IMPACT ON STUDENTS

The impact study portion of the evaluation investigated the following research questions:

1. Do CCRE high schools have a higher percentage of students on-track in college preparatory course completion in ninth grade as compared to comparison schools?
2. Do CCRE high schools have a higher percentage of students on-track in college preparatory course completion in tenth grade as compared to comparison schools?
3. Do CCRE high schools have fewer students dropping out than the comparison schools?
4. Do CCRE high schools have a higher percentage of students enrolling in college courses than the comparison schools?
5. Do students in CCRE high schools receive more college credits than students in the comparison schools?

To determine the impact of the program, the evaluation used a quasi-experimental design in which participating schools were matched to similar, non-participating schools, and the outcomes of interest were compared.

III.1.1. School Sample

Under the quasi-experimental framework, we identified a group of comparison schools that closely matched the CCRE program schools (treatment schools) on various demographic and performance variables the year before the program began. Using a comparison group allowed us to determine the impact of the program based on the differences in outcomes between schools who participated in CCRE versus other Ohio high schools not participating in the program.

We determined comparison group schools using the genetic matching algorithm from the MatchIt package in R. Each of the 16 treatment schools was matched to two comparison schools (for a total of 32 comparison schools). We selected the comparison schools from a pool of 394 schools; this pool excluded schools within Columbus State's service region, charter schools, small stand-alone early college high schools, alternative schools, and schools with missing data. We derived all school-level variables from the Ohio Department of Education's (ODE) administrative data from 2015–16, the last school year prior to the beginning of the CCRE program. All student-level variables were determined using students' eighth grade data. Table III-1 (page 13) summarizes all variables used in the matching procedure under the domains of demographics, pre-high school student academic performance, and school-level baseline outcomes. The final analytic sample contained 48 schools (32 comparison and 16 treatment).

We also used student-level measures to assess baseline equivalence at the student level and to include in the analyses. Table III-2 (page 15) lists these variables; the first four were used for student-level baseline equivalence and all were incorporated into the impact models.

Baseline Equivalence

We conducted analyses to demonstrate the extent to which treatment and comparison schools were similar at baseline on school-level measures of school baseline characteristics. Those results are presented first. We also conducted analyses to demonstrate the extent to which the treatment and comparison students used in each of the impact analyses were similar to one another on student-level baseline characteristics. Those results a presented after the results on the baseline equivalence of schools.

School-level baseline equivalence. We began by assessing baseline equivalence at the school-level using data from two primary sources: 1) publicly available measures of school demographics and 2) baseline outcome measures calculated from restricted-use student-level data.

Table III-1. Definitions of Variables used for Matching and Baseline Equivalence

Variable	Description
School Demographics (Matching and baseline equivalence conducted at the school level)	
Percent Underrepresented Race/Ethnicity (2015-16)	"Underrepresented race/ethnicity" includes students who are members of racial or ethnic groups traditionally underrepresented in college. These include the percentage of Black, Hispanic/Latino, Multiracial, and American Indian/Alaska Native students, calculated from the public Ohio School Report Card *Building Race/Ethnicity* file.
Percent Economically Disadvantaged (2015-16)	Low-income students are a target population of the intervention. This variable includes the percentage of students who are designated in the state data as "economically disadvantaged," calculated from the public Ohio School Report Card *Building Economically Disadvantaged* file.
Percent of Students with One or More Disabilities (2015-16)	The proportion of students with disabilities provides evidence of special populations within a school who may receive additional services through their high school. This figure was calculated from data in the ODE student-level *Enrollment* file as the proportion of students with one or more disability codes.
Number of Students Enrolled in Grades 9–12 (2015-16)	This is a measure of school size, calculated from the public Ohio School Report Card *Building Enrollment* file.
School Serves Grades 7–12 (2015-16)	In the 16 CCRE treatment group schools, 15 serve grades 9–12 and one serves grades 7-12. This variable indicates whether a school serves middle grades (7–8), with data coming from the public Ohio School Report Card *Building Enrollment* file.
School-Level Baseline Academic Performance (Matching conducted at the school level)	
Mean 8th Grade Math Z-Score in 2015-16 for 2016-17 9th Grade Cohort (Used only for matching)	This school-level baseline measure was created using student-level 8th grade math scores from the ODE student-level *Assessment* file. The largest share of students took the Math 8 EOG, the Algebra I EOC, or the Math I EOC in 2015-16, but some students in the sample took Geometry or Math II in 2015-16. A z-score was calculated for each student's performance relative to all other test takers in the state for a given subject and year. A mean score was calculated for the school.
Mean 8th Grade ELA Z-Score in 2015-16 for 2016-17 9th Grade Cohort (Used only for matching)	This school-level baseline measure was created using students' 8th grade ELA scores from the ODE student-level *Assessment* file. The largest share of students took the Reading 8 EOG in 2015-16, but some students in the sample took English I in 2015-16. A z-score was calculated for each student's performance relative to all other test takers in the state for a given subject and year. A mean score was calculated for the school.

Table III-1. Definitions of Variables used for Matching and Baseline Equivalence (continued)

Variable	Description
School-Level Baseline Outcomes (Matching and baseline equivalence conducted at the school level)	
Percent of On-Track Students (Using EOC Point Definition) for 2015-16 9th Grade Cohort	This is a baseline measure at the school level for the 2015-16 cohort of 9th grade students, one of the outcomes examined in the study. The measure was calculated using the same criteria as that for the 9th grade on-track outcome,[2] using graduation points earned by students in the ODE student-level *Assessment* file.
Dropout Rate in Grades 9–12 in 2015-16	The extent to which students persist in school is one of the outcomes examined in the study. The school-level dropout rates from the 2015-16 school year were calculated using the ODE student-level *Dropout* file. The baseline outcome was calculated using the same procedure as the one used in calculating the outcome for the analytic sample.
Percent of Students in Grades 10–12 Taking[3] One or More Dual-enrollment courses (CCP) in 2015-16	The percentage of students taking college courses in high school is an outcome of the study. This is a baseline measure at the school level for the 2015-16 cohort of 10–12 grade students for dual-enrollment courses through the College Credit Plus (or CCP) program. The measure was calculated using the ODE student-level *Courses* file. If a student had at least one course record for CCP (in Ohio administrative data as 'PS'), the variable was coded as a 1 and 0 otherwise. The school-level measure is the proportion of students in the sample coded as a 1 for CCP coursetaking.
Percent of Students in Grades 10–12 Taking One or More AP Courses in 2015–16	The percentage of students taking college courses in high school is an outcome of the study. This is a baseline measure at the school level for the 2015-16 cohort of grade 10–12 students for Advanced Placement (AP) courses taken. The measure was calculated using the ODE student-level *Courses* file. If a student had at least one course record for an AP class, the variable was coded as a 1 and 0 otherwise. The school-level measure is the proportion of students in the sample coded as a 1 for AP coursetaking.
Mean College Credits Earned by Class of 2016	The mean number of college credits is an outcome of the study. This is a baseline of the school-level mean number of college credits earned by students in the Class of 2016. At the student level, the number of dual credits was determined by the value in the ODE student-level *Grad Core* file. The number of equivalent college credits earned through AP was calculated using ODE student-level AP test scores cross-walked with the number of college credits corresponding to the AP score for Ohio University.

[2] More details on the on-track definition are provided in section III.1.2.

[3] More details on why Grades 10–12 were used for the college coursetaking sample are offered in section II.1.2.4 of this report.

Table III-2. Definitions of Student-Level Variables Used in Analyses

Outcome and Population	CCRE Adjusted Mean
Baseline Math Z-Score	This is a baseline measure at the student level for students' 8th grade math score from the ODE student-level *Assessment* file. A z-score was calculated for each student's performance relative to all other test takers in the state for a given subject and year.
Baseline ELA Z-Score	This is a baseline measure at the student level for students' 8th grade ELA score from the ODE student-level *Assessment* file. A z-score was calculated for each student's performance relative to all other test takers in the state for a given subject and year.
Economically Disadvantaged Status	This is a student-level measure from the Enrollment file for economically disadvantaged status in the *Enrollment* file in a) a student's 8th grade year or b) the most recent year available if the student's 8th grade record is missing. The variable is coded as 1 if the source data value ECON_DIS is "Y" and 0 if ECON_DIS is "N" in the year of interest.
Underrepresented Race/Ethnicity Status	This is a student-level measure from the *Enrollment* file for race/ethnicity membership in a group underrepresented in higher education in a) a student's 8th grade year or b) the most recent year available if the student's 8th grade record is missing. This variable is coded as 1 if the source data value of RACE_CODE is in the set {"B", "H", "I", "M", "P"} and 0 if the value of RACE_CODE is in the set {"A", "W"}.
Limited English Proficient Status	This is a student-level measure from the *Enrollment* file for limited English proficient status in the current school year. The variable is coded as 1 if the source data value of LEP_CODE is "N"and 0 for all other non-missing values.
Disability Status	This is a student-level measure from the *Enrollment* file for disability status in the current school year. The variable is coded as 1 if the source data value of DISAB_CODE is "**" (indicating no disability codes) and 0 for all other non-missing values.
Gender	This is a student-level measure from the *Enrollment* file for gender in a) a student's 8th grade year or b) the most recent year available if the student's 8th grade record is missing. The variable is coded as 1 if the source data value of GENDER_CODE is "M" and 0 for a GENDER_CODE of "F."

For the school-level demographic measures shown in Table III-3 (page 16), we used school-level data from the Ohio Department of Education. Because we wanted to account for the fact that the schools were of varying sizes,[4] we weighted the treatment and comparison means by the total grade 9–12 enrollment in a school. In other words, we multiplied the school-level percentages by the number of students enrolled in Grades 9–12 in 2015–16 to determine their contribution to the weighted treatment and comparison means. For dichotomous variables, we calculated the effect size using Cox's Index. For the continuous variable of enrollment, we calculated the effect size using Hedges' g as the weighted difference in means divided by the weighted standard deviation. The formula for weighted standard deviation is as follows — for each school i, the enrollment n and the overall mean μ:

[4] The weighting also allowed us to replicate the results that would have occurred if we had created these measures using student-level data as was done with the baseline measures of the outcomes and as was done with the impact analyses.

Table III-3. School-Level Baseline Equivalence – Baseline School-Level Demographics

Variable	Treat N	Comp N	Weighted Treatment Mean	Weighted Comparison Mean	Effect Size
School-Level Demographics (calculated from school-level baseline data)					
Pct Underrepresented Race/ Ethnicity (2015-16)	15,416 (16 sch)	30,999 (32 sch)	44.5%	46.7%	-.08
Pct Economically Disadvantaged (2015-16)	15,416 (16 sch)	30,999 (32 sch)	60.9%	59.7%	.04
Pct Students with a Disability (2015-16)	15,416 (16 sch)	30,999 (32 sch)	14.5%	14.9%	-.08
Percentage of Schools with Grades 7–12 (2015-16)	16 sch	32 sch	3.7%	6.6%	-.12
Enrollment in Grades 9–12 (2015-16)	15,416 (16 sch)	30,999 (32 sch)	969 (*SD*=468)	964 (*SD*=404)	.01

$$\text{Weighted SD} = \frac{(\Sigma n_i (\bar{x}_i - \mu)^2}{\Sigma n_i - 1}$$

For the baseline outcomes calculated from student-level baseline data shown in Table III-4 (page 17), we first used a hierarchical linear model (HLM) with the covariate as the outcome, a treatment indicator, and a school-level random intercept to calculate the difference between the treatment and comparison students. For the baseline outcomes calculated from student-level baseline data shown in Table III-4, we calculated the group means for students attending the treatment and comparison schools. For dichotomous outcomes, we calculated Cox's Index for the treatment mean and comparison mean. For the continuous outcome, we divided the difference of the treatment and comparison means by the pooled standard deviation to calculate Hedges' *g*.

As the tables show, the two groups of schools were equivalent on all measures with effect sizes of .14 *SD* or less.

Because we used baseline measures from a previous cohort of students, we also assessed the representativeness of each sample for each outcome. The sample criteria are described separately for each outcome. We used the same approach for creating the samples for the baseline measures as well as for the outcome measures. Our analyses of representativeness for all samples showed that the study met What Works Clearinghouse (WWC) Standards for representativeness. Tables for each sample can be found in Appendix B.

Student-Level Baseline Equivalence. The school-level baseline equivalence above demonstrates that the schools were equivalent at baseline. As an extra check on our sample, we

Table III-4. School-Level Baseline Equivalence – Baseline Outcomes from Student-Level Data

Variable	Treat N	Comp N	Treatment Mean	Comparison Mean	Effect Size
Baseline Outcomes (calculated from student-level baseline data)					
Pct of On-Track Students (Using EOC Point Definition) for 2015-16 9th Grade Cohort	3,918 (16 sch)	7,454 (32 sch)	47.1%	49.2%	-.05
Dropout Rate in Grades 9-12 in 2015-16	14,373 (16 sch)	28,389 (32 sch)	3.3%	3.1%	.04
Pct of Students in Grades 10-12 Taking One or More Dual-enrollment courses (CCP) in 2015-16	10,603 (16 sch)	22,161 (32 sch)	9.3%	9.0%	.02
Pct of Students in Grades 10-12 Taking One or More AP Courses in 2015-16	10,603 (16 sch)	22,161 (32 sch)	14.5%	11.8%	.14
Mean College Credits Earned by Class of 2016	2,665 (16 sch)	6,039 (32 sch)	2.45 (*SD*=5.85)	2.51 (*SD*=6.62)	-.01

also assessed baseline equivalence at the student level for the analytic sample of students defined for each outcome. We checked student-level baseline equivalence for two primary demographic characteristics, economically disadvantaged status and race/ethnicity, as well as middle school achievement measures in ELA and math. We calculated the difference between the treatment and comparison schools using the coefficient of a simple hierarchical linear model (HLM) model to account for the nesting of students within schools with the baseline equivalence variable (such as economically disadvantaged) as the outcome, a binary treatment indicator, and a random intercept for the school. The coefficient on the treatment indicator represents the difference. We then calculated Cox's Index for the effect size on the dichotomous outcomes and Hedges' *g* (the coefficient divided by the pooled standard deviation) for the continuous outcomes. We replicated these analyses for two different sub-groups: racially/ethnically underrepresented students and economically disadvantaged students. It is important to note that there were some schools that did not have any non-economically disadvantaged students or non-underrepresented race/ethnicities; as a result, those sub-groups in the tables below include a different number of schools. Student-level baseline equivalence for the analytic sample for each outcome measure is presented below for each outcome measure.

III.1.2. Outcome Measures, Analytic Sample, and Student-level Baseline Equivalence

The study assessed the impact of CCRE on a core set of high school student outcomes: 1) students' successful progression in a college preparatory course of study, 2) the number of students staying in school, and 3) student enrollment and success in college-level courses. The measure, student-level sample for that measure, and modifications to the general analytic approach are discussed below.

III.1.2.1. Ninth Grade On-Track in 2017–18 and 2018–19

Outcome 1 measured the extent to which students were on-track for high school graduation in sample schools by the end of their ninth grade year, determined by graduation points students earned on End of Course (EOC) tests. This outcome was measured for two cohorts, ninth-graders in 2017–18 (Year 2 of full implementation) and in 2018–19 (Year 3 of full implementation).

Outcome Variable. We designed Outcome 1 to assess the extent to which ninth grade students made academic progress that would allow them to graduate from high school prepared for career or college. In other studies, we have conceptualized this as successful completion of courses that are part of a college preparatory course of study. The availability of data in Ohio has changed the way in which we defined this outcome. ODE data provided information on course enrollments and scores on subject-specific End of Course (EOC) tests. The data did not include information about the grade a student received or whether a student passed a course. Thus, instead of conceptualizing a student as on-track for graduation based on passing ninth grade math and English coursework, we used data from EOC assessments to determine whether a student was on-track for graduation.

Under a state policy that began with the high school graduating class of 2018, one path for high school graduation involves earning points based on achievement levels on seven specific EOC tests.[5] Students can earn between 1 and 5 EOC graduation points for each subject, determined by their score on each test. To earn their high school diploma through this pathway, students must earn 18 total points on EOC tests across the seven subjects. In addition, students must earn at least four points in math (across two subjects), four points in English (across two subjects), and six points in science and social studies (across three subjects).

For this study, we defined a student's status as on-track for graduation in 9th grade as follows. By the end of 9th grade, students should have earned at least five total graduation points, with at least two points in a first-level math course (Algebra I or Integrated Math I) and at least two points in a first-level English course (English I). Each student in the ninth grade analytic sample received a value of 1 if they met these criteria and a 0 otherwise. Because some students took their first-level high school courses and the accompanying EOC in the eighth grade, the tests that contributed to on-track status may have been taken in either the 2016–17 or 2017–18 school years for the 2017–18 analysis in either the 2017–18 or 2018–19 school years for the 2018–19 analysis.

Analytic Sample. In identifying students who should be included in the ninth grade analytic sample, we did not want to include students who had entered the high school mid-way through their ninth grade year because these students would not have had the full benefit of the intervention. The administrative data from ODE did not include enrollment dates for students. However, the data included each student's Average Daily Membership (ADM), which designated the proportion of the school year students were enrolled at each Ohio public school. In the outcome analytic sample, we included all ninth grade students who attended one of the 48 sample schools and who had an ADM of .95 or higher. Students who dropped out of one of the sample schools during the year in which outcomes were measured were also included in the sample, regardless of their ADM. Students with an ADM of less than .95 (indicating that they had moved schools during the year) were excluded. For the main confirmatory analysis, we combined data from Years 2 and 3 (2017–18 and 2018–19) to create a pooled sample. When combining the data, we included student-level observations that met the sample criteria for each year and dummy-coded the project year (2017–18 as 0 and 2018–19 as 1) as a covariate in each model.

Baseline Equivalence. As noted above, we calculated baseline equivalence for the students in the analytic sample. As Table III-5 (page 19) shows, the sample of students was equivalent when we looked at the relevant demographic characteristics and achievement measures.

[5] http://education.ohio.gov/Topics/Ohio-s-Graduation-Requirements/18-Points-on-State-Tests

Table III-5. Student-Level Baseline Equivalence for the Ninth Grade On-Track Sample

Sample	Variable	Treat N	Comp N	Adj. Treatment Mean	Unadj. Comparison Mean	Difference (Beta)	Effect Size (SD)
All Students Pooled	Pct Economically Disadvantaged	7,749 (16 sch)	14,481 (32 sch)	.651	.654	-.003	-.01
	Pct Underrepresented Race/Ethnicity	7,749 (16 sch)	14,481 (32 sch)	.513	.495	.018	.04
	ELA Baseline Z-Score	7,749 (16 sch)	14,481 (32 sch)	-.268 (*SD*=.963)	-.245 (*SD*=.980)	-.023	-.03
	Math Baseline Z-Score	7,749 (16 sch)	14,481 (32 sch)	-.164 (*SD*=1.02)	-.123 (*SD*=1.11)	-.041	-.04
All Students Year 2 (2017-18)	Pct Economically Disadvantaged	3,919 (16 sch)	7,328 (32 sch)	.648	.649	-.001	.00
	Pct Underrepresented Race/Ethnicity	3,919 (16 sch	7,328 (32 sch)	.512	.493	.019	.05
	ELA Baseline Z-Score	3,919 (16 sch)	7,328 (32 sch)	-.323 (*SD*=.968)	-.290 (*SD*=1.00)	-.033	-.04
	Math Baseline Z-Score	3,919 (16 sch)	7,328 (32 sch)	-.166 (*SD*=.992)	-.151 (*SD*=1.09)	-.015	-.02
All Students Year 3 (2018-19)	Pct Economically Disadvantaged	3,830 (16 sch)	7,153 (32 sch)	.657	.660	-.003	-.01
	Pct Underrepresented Race/Ethnicity	3,830 (16 sch)	7,153 (32 sch)	.513	.496	.017	.04
	ELA Baseline Z-Score	3,830 (16 sch)	7,153 (32 sch)	-.213 (*SD*=.954)	-.199 (*SD*=.953)	-.014	-.02
	Math Baseline Z-Score	3,830 (16 sch)	7,153 (32 sch)	-.162 (*SD*=1.06)	-.095 (*SD*=1.14)	-.067	-.07

Note: Effect sizes were calculated using Hedges' *g* for continuous variables and Cox's index for dichotomous variables.

We repeated this procedure to calculate student-level baseline equivalence for the sub-groups. Table III-6 shows that all measures met standards of equivalence except for the race/ethnicity measure for the non-economically disadvantaged sub-group. Care should be taken in interpreting results for that subgroup. Separate analyses (not reported here) indicated that there was equivalence for each of the individual year samples as well. For this outcome, we also added another sub-group that included students who entered high school without any graduation points; baseline equivalence for this sample is shown in the table.

Table III-6. Student-Level Baseline Equivalence for the Ninth Grade On-Track Sample—Pooled Year Subgroups

Sample	Variable	Treat N	Comp N	Adj. Treatment Mean	Unadj. Comparison Mean	Difference (Beta)	Effect Size (SD)
Economically Disadvantaged Students (EDS) Pooled	Pct Economically Disadvantaged	5,074 (16 sch)	9,474 (32 sch)	1.000	1.000	.000	.00
	Pct Underrepresented Race/Ethnicity	5,074 (16 sch)	9,474 (32 sch)	.700	.653	.047	.13
	ELA Baseline Z-Score	5,074 (16 sch)	9,474 (32 sch	-.516 (*SD*=.920)	-.520 (*SD*=.901)	.004	.01
	Math Baseline Z-Score	5,074 (16 sch)	9,474 (32 sch)	-.445 (*SD*=.958)	-.466 (*SD*=.966)	.021	.02
Not EDS Students Pooled	Pct Economically Disadvantaged	2,675 (12 sch)	4,973 (18 sch)	.000	.000	.000	.00
	Pct Underrepresented Race/Ethnicity	2,675 (12 sch)	4,973 (18 sch)	.277	.191	.086	.29
	ELA Baseline Z-Score	2,675 (12 sch)	4,973 (18 sch)	.151 (*SD*=.913)	.280 (*SD*=.907)	-.129	-.14
	Math Baseline Z-Score	2,675 (12 sch)	4,973 (18 sch)	.297 (*SD*=.997)	.533 (*SD*=1.08)	-.236	-.22
Underrepresented Race/Ethnicity Pooled	Pct Economically Disadvantaged	3,684 (16 sch)	7,166 (32 sch)	.868	.863	.005	.03
	Pct Underrepresented Race/Ethnicity	3,684 (16 sch)	7,166 (32 sch)	1.000	1.000	.000	.00
	ELA Baseline Z-Score	3,684 (16 sch)	7,166 (32 sch)	-.619 (*SD*=.899)	-.621 (*SD*=.863)	.002	.00
	Math Baseline Z-Score	3,684 (16 sch)	7,166 (32 sch)	-.437 (*SD*=.952)	-.587 (*SD*=.903)	.150	.16
Not Under-represented Race/ Ethnicity Pooled	Pct Economically Disadvantaged	4,065 (16 sch)	7,299 (29 sch)	.435	.448	-.013	-.03
	Pct Underrepresented Race/Ethnicity	4,065 (16 sch)	7,299 (29 sch)	.000	.000	.000	.00
	ELA Baseline Z-Score	4,065 (16 sch)	7,299 (29 sch)	-.003 (*SD*=.963)	.125 (*SD*=.946)	-.128	-.13
	Math Baseline Z-Score	4,065 (16 sch)	7,299 (29 sch)	.159 (*SD*=1.02)	.332 (*SD*=1.11)	-.173	-.16

Table III-6. Student-Level Baseline Equivalence for the Ninth Grade On-Track Sample—Pooled Year Subgroups (continued)

Sample	Variable	Treat N	Comp N	Adj. Treatment Mean	Unadj. Comparison Mean	Difference (Beta)	Effect Size (SD)
Students with No Pre-HS Graduation Points	Pct Economically Disadvantaged	6,186 (16 sch)	11,649 (32 sch)	.701	.706	-.005	-.02
	Pct Underrepresented Race/Ethnicity	6,186 (16 sch)	11,649 (32 sch)	.563	.543	.020	.05
	ELA Baseline Z-Score	6,186 (16 sch)	11,649 (32 sch)	-.625 (*SD*=.841)	-.594 (*SD*=.865)	-.031	-.04
	Math Baseline Z-Score	6,186 (16 sch)	11,649 (32 sch)	-.249 (*SD*=.877)	-.245 (*SD*=.955)	-.004	-.01

Note: Effect sizes were calculated using Hedges' *g* for continuous variables and Cox's index for dichotomous variables.

III.1.2.2. Tenth Grade On-Track in 2018–19

Outcome 2 measured the extent to which students were on-track for high school graduation in sample schools by the end of their tenth grade year. Like Outcome 1, we determined on-track status using graduation points students earned on End of Course (EOC) tests.

Outcome Variable. We defined a student's status as on-track in tenth grade in a similar manner to the ninth grade on-track outcome. By the end of tenth grade, students should have taken six of the seven courses with EOC tests required for graduation, two tests in math, two tests in English, and two tests in science and social studies. We defined students who earned at least 15 total points by the end of tenth grade as on-track to reach the 18 points needed for high school graduation. In addition, students needed to have earned at least four points respectively in each subject category of English, math, and science/social studies. Students meeting the total graduation point threshold for each subject received a value of 1. Students not meeting one or more of these criteria received a 0. For the assessment of tenth grade on-track status in 2018–19, students could have taken tests contributing to their graduation points in all years up to and including 2018–19. Thus, we looked at the cumulative assessment file from 2015–16 to 2018–19 to account for all tests that students took through the end of their tenth grade year

Analytic Sample. We used the same criteria to select students for the tenth grade sample in Outcome 2 as the ninth grade sample in Outcome 1. We included all tenth grade students who attended one of the 48 sample schools and who had an ADM of .95 or higher. Students who dropped out of one of the sample schools during the year in which outcomes were measured were also included in the sample, regardless of their ADM. Students with an ADM of less than .95 (indicating that they had moved schools during the year) were excluded.

Baseline Equivalence for Analytic Sample. As with the ninth grade sample, we calculated baseline equivalence for the students in this analytic sample. As Table III-7 (page 22) shows, the student sample was equivalent for the measures we examined.

Table III-8 (page 23) shows the equivalence for the specific sub-groups of interest. All measures met standards of equivalence except for the race/ethnicity measure for the non-economically disadvantaged sub-group. Care should be taken in interpreting results for that subgroup.

Table III-7. Baseline Equivalence for the Year 3 Tenth Grade Analytic Sample

	Variable	Treat N	Comp N	Adj. Treatment Mean	Unadj. Comparison Mean	Difference (Beta)	Effect Size (SD)
All Students 2018-19	Pct Economically Disadvantaged	3,422 (16 sch)	6,582 (32 sch)	.618	.616	.002	.01
	Pct Underrepresented Race/Ethnicity	3,422 (16 sch)	6,582 (32 sch)	.502	.471	.031	.08
	ELA Baseline Z-Score	3,422 (16 sch)	6,582 (32 sch)	-.230 (*SD*=.946)	-.203 (*SD*=.989)	-.027	-.03
	Math Baseline Z-Score	3,422 (16 sch)	6,582 (32 sch)	-.054 (*SD*=.958)	-.055 (*SD*=1.08)	.001	.00

Note: Effect sizes were calculated using Hedges' *g* for continuous variables and Cox's index for dichotomous variables.

III.1.2.3. Dropping Out of School in 2018–19

For Outcome 3, we explored the impact of the CCRE program on students dropping out of school. We defined dropouts using withdrawal codes in the ODE data.

Outcome Variable. We defined the dropout outcome as ODE records with withdrawal codes of 71–79, described in Table III-9 (page 24). If a student appeared in the list of withdrawal codes in this range, they were coded as a 1 for dropping out. All other enrolled students meeting the ADM threshold in each program school were coded as 0 for the dropout outcome.

Analytic Sample. We built our student-level analytic sample from the enrollment data for the 2018–19 school year, including students in grades 9–12 in the 48 sample schools. For students with records at multiple schools, we retained the record for which they recorded the maximum ADM. We considered a student to be enrolled in a school for the year if they had an ADM value of .95 or greater or dropped out of a sample school in 2018–19.

Missing baseline test scores were a concern for students who dropped out because these students were more likely to not have baseline test scores recorded in the ODE data. Our full impact model for the confirmatory analysis did not include baseline test scores due to losing many of the students who dropped out from the analytic sample. Thus, we did not exclude students with missing baseline test covariates, as we did for the other analyses. It is important to note that this is acceptable given that we have already demonstrated school-level baseline equivalence on dropout rates (see Table III-4, page 17) using the same approach to create the baseline measure as we used for the outcome measure. The representativeness of both the baseline measure and the outcome measure samples can be found in Table B-3 in Appendix B.

To ensure this decision did not alter our interpretation of the results, we conducted a follow-up sensitivity analysis for students with non-missing baseline test scores and assessed baseline equivalence for that analytic sample as well. We also used the sample with non-missing test scores to conduct all subgroup analyses.

There was also a possibility that a student dropped out of a sample school prior to the 2018–19 school year (but was recorded as a dropout for the 2018–19 school year) and did not ever get recorded in the year's enrollment file. We added 355 records to the analytic sample that signaled this

Table III-8. Baseline Equivalence for the Year 3 Tenth Grade Subgroup Analytic Samples

	Variable	Treat N	Comp N	Adj. Treatment Mean	Unadj. Comparison Mean	Difference (Beta)	Effect Size (SD)
EDS Students 2018-19	Pct Economically Disadvantaged	2,111 (16 sch)	4,056 (32 sch)	1.000	1.000	.000	.00
	Pct Underrepresented Race/Ethnicity	2,111 (16 sch)	4,056 (32 sch)	.693	.642	.051	.14
	ELA Baseline Z-Score	2,111 (16 sch)	4,056 (32 sch)	-.478 (*SD*=.904)	-.496 (*SD*=.913)	.018	.02
	Math Baseline Z-Score	2,111 (16 sch	4,056 (32 sch)	-.312 (*SD*=.908)	-.396 (*SD*=.948)	.084	.09
Not EDS Students 2018-19	Pct Economically Disadvantaged	1,311 (11 sch)	2,526 (19 sch	.000	.000	.000	.00
	Pct Underrepresented Race/Ethnicity	1,311 (11 sch)	2,526 (19 sch	.283	.197	.086	.32
	ELA Baseline Z-Score	1,311 (11 sch)	2,526 (19 sch)	127 (*SD*=.907)	.268 (*SD*=.922)	-.141	-.15
	Math Baseline Z-Score	1,311 (11 sch)	2,526 (19 sch	.299 (*SD*=.940)	.492 (*SD*=1.05)	-.193	-.21
Underrepresented Race/ Ethnicity 2018-19	Pct Economically Disadvantaged	1,584 (16 sch)	3,099 (32 sch)	.836	.840	-.004	-.02
	Pct Underrepresented Race/Ethnicity	1,584 (16 sch)	3,099 (32 sch	1.000	1.000	.000	.00
	ELA Baseline Z-Score	1,584 (16 sch)	3,099 (32 sch	-.545 (*SD*=.881)	-.584 (*SD*=.867)	.039	.05
	Math Baseline Z-Score	1,584 (16 sch)	3,099 (32 sch	-.415 (*SD*=.891)	-.518 (*SD*=.879)	.103	.11
Not Underrepresented Race/ Ethnicity 2018-19	Pct Economically Disadvantaged	1,838 (16 sch)	3,477 (29 sch)	.406	.417	-.011	-.03
	Pct Underrepresented Race/Ethnicity	1,838 (16 sch)	3,477 (29 sch)	.000	.000	.000	.00
	ELA Baseline Z-Score	1,838 (16 sch)	3,477 (29 sch)	-.002 (*SD*=.944)	.136 (*SD*=.968)	-.138	-.15
	Math Baseline Z-Score	1,838 (16 sch)	3,477 (29 sch)	.200 (*SD*=.946)	.356 (*SD*=1.07)	-.156	-.17

Table III-9. ODE Withdrawal Codes Used in Dropout Definition

Withdrawal Code	Withdrawal reason[6]
71	Withdrew due to truancy/nonattendance
72	Pursued employment/work permit
73	Over 18 years of age
74	Moved, not known to be continuing
75	Student completed course requirements but did not pass statewide assessments required for graduation
76	Non-attendance according to the 72-hour rule
79	No longer eligible to be enrolled in district

scenario—a dropout record attached to a sample school in 2018–19 with no accompanying enrollment record. For these students, we used student demographic covariates from a prior school year for our models.

Baseline Equivalence. Because our main analysis did not include baseline test scores as covariates, we demonstrated equivalence at the school level for this outcome (see Tables III-3 and III-4). As an additional check, we also assessed baseline equivalence on this sample at the student level on the percentage economically disadvantaged, underrepresented race/ethnicity, and missing one or both baseline achievement measures, summarized in Table III-10 (page 25).

We also assessed measures of baseline equivalence for the students in our sensitivity analysis who had no missing data. Table III-11 (page 26) shows the groups were equivalent on the demographic characteristics, on the percentage of students missing achievement data and on achievement for those students with non-missing data. These analyses were replicated with the various sub-groups with all differences falling below the 0.25 standard deviation threshold recommended by the WWC Standards.

III.1.2.4. College Course Enrollment in 2018–19

Outcome 4 addressed the impact of the CCRE program on college course enrollment. We defined the college course enrollment outcome in three ways: students taking a) one or more of either College Credit Plus (CCP) or Advanced Placement (AP) courses, b) one or more CCP courses, or c) one or more AP courses.

Outcome Variable. For Outcome 4, we wanted to determine how many students had one or more records corresponding to a college-level course, defined as either a College Credit Plus (CCP) or Advanced Placement (AP) course. This information came from the ODE course information file with information about all courses taught in Ohio schools. We filtered it to include only those courses with curriculum code values of PS (Postsecondary, which applied to CCP courses) and AP. We then created two dichotomous variables in the student analytic sample that indicated whether a student took at least one CCP course and at least one AP course. From these values we calculated a third dichotomous variable indicating whether a student took at least one of either of these types of college-level courses. These three measures serve as the student-level outcome variables for the college course enrollment outcome.

[6]EMIS Manual 2.4, Student Standing (FS) Record (http://education.ohio.gov/getattachment/Topics/Data/EMIS/EMIS-Documentation/Current-EMIS-Manual/2-4-Student-Standing-FS-Record-v10-2.pdf.aspx?lang=en-US)

Table III-10. Baseline Equivalence for the Year 3 Dropout Analytic Sample

Sample	Variable	Treat N	Comp N	Adj. Treatment Mean	Unadj. Comparison Mean	Difference (Beta)	Size (SD)
All Students 2018-19	Pct Economically Disadvantaged	14,875 (16 sch)	27,845 (32 sch)	.634	.632	.002	.01
	Pct Underrepresented Race/Ethnicity	14,875 (16 sch)	27,845 (32 sch)	.508	.488	.020	.05
	Pct Missing Either ELA or Math Baseline Score	14,875 (16 sch)	27,845 (32 sch)	.100	.081	.019	.14
	ELA Baseline Z-Score (Non-Missing)	13,382 (16 sch)	25,593 (32 sch)	-.201 (*SD*=.974)	-.193 (*SD*=.996)	-.008	-.01
	Math Baseline Z-Score (Non-Missing)	13,382 (16 sch)	25,593 (32 sch)	-.106 (*SD*=.929)	-.094 (*SD*=1.03)	-.012	-.01

Note: Effect sizes were calculated using Hedges' *g* for continuous variables and Cox's index for dichotomous variables.

Analytic Sample. We built our student-level analytic sample from the enrollment data for the 2018–19 school year, including students in grades 10–12 in the 48 sample schools. Our original plan was to include students in grades 9–12, however, starting in the 2019–20 school year, one of the treatment districts moved all ninth-grade students in the district to a new school. Because this was a new school in 2019–20, including ninth-grade students in the analysis with Year 4 outcomes would be problematic due to missing school-level baseline covariates. To deal with this issue, we decided to change the analytic sample to students in grades 10–12 so we could include both Year 3 and Year 4 outcomes in our analysis.

For students with records at multiple schools, we retained the record for which they recorded the maximum ADM. Students in the sample with missing data for any of the model covariates were also removed from the sample using listwise deletion. We also considered a student to be enrolled in a school for the year if they had an ADM value of .50 or greater or dropped out of a sample school in 2018–19. We chose a different ADM threshold for this outcome because many eleventh and twelfth grade students in Ohio were concurrently enrolled part-time in their home high school and part-time in other programs (such as a career center or other high school offering specialized coursework). To ensure we captured these students in the sample, we included all students who were enrolled in a sample school at least half of their time.

Baseline Equivalence. Our analyses of baseline equivalence for the students in the analytic sample show that the sample was equivalent (Table III-12, page 27).

Table III-13 (pages 28-29)) shows the baseline equivalence for the students in the sub-groups for the pooled sample. As the table shows, no differences between the two sub-groups exceeded the .25 standard deviation threshold; thus, the groups can be considered equivalent.

Table III-11. Baseline Equivalence for the Year 3 Dropout Analytic Sample Subgroups

Sample	Variable	Treat N	Comp N	Treatment Mean	Comparison Mean	Difference (Beta)	Effect Size (SD)
All Students with Non-Missing Baseline Test Scores 2018-19	Pct Economically Disadvantaged	13,382 (16 sch)	25,593 (32 sch)	.621	.627	-.006	-.02
	Pct Underrepresented Race/Ethnicity	13,382 (16 sch)	25,593 (32 sch)	.503	.483	.020	.05
	ELA Baseline Z-Score	13,382 (16 sch)	25,593 (32 sch)	-.197 (*SD*=.971)	-.192 (*SD*=.995)	-.005	-.01
	Math Baseline Z-Score	13,382 (16 sch)	25,593 (32 sch)	-.102 (*SD*=.928)	-.091 (*SD*=1.02)	-.011	-.01
EDS Students with Non-Missing Baseline Test Scores 2018-19	Pct Economically Disadvantaged	8,205 (16 sch)	16,054 (32 sch)	1.000	1.000	.000	.00
	Pct Underrepresented Race/Ethnicity	8,205 (16 sch)	16,054 (32 sch)	.704	.654	.050	.14
	ELA Baseline Z-Score	8,205 (16 sch)	16,054 (32 sch)	-.451 (*SD*=.931)	-.475 (*SD*=.928)	.024	.03
	Math Baseline Z-Score	8,205 (16 sch)	16,054 (32 sch)	-.365 (*SD*=.916)	-.417 (*SD*=.919)	.052	.05
Not EDS Students with Non-Missing Baseline Test Scores 2018-19	Pct Economically Disadvantaged	5,177 (12 sch)	9,539 (20 sch)	.000	.000	.000	.00
	Pct Underrepresented Race/Ethnicity	5,177 (12 sch)	9,539 (20 sch)	.242	.195	.047	.17
	ELA Baseline Z-Score	5,177 (12 sch)	9,539 (20 sch)	.159 (*SD*=.938)	.282 (*SD*=.924)	-.123	-.13
	Math Baseline Z-Score	5,177 (12 sch)	9,539 (20 sch)	.260 (*SD*=.861)	.452 (*SD*=.962)	-.192	-.21
Under-represented Race/Ethnicity with Non-Missing Baseline Test Scores 2018-19	Pct Economically Disadvantaged	6,163 (16 sch)	12,353 (32 sch)	.853	.850	.003	.01
	Pct Underrepresented Race/Ethnicity	6,163 (16 sch)	12,353 (32 sch)	1.000	1.000	.000	.00
	ELA Baseline Z-Score	6,163 (16 sch)	12,353 (32 sch)	-.539 (*SD*=.918)	-.567 (*SD*=.885)	.028	.03
	Math Baseline Z-Score	6,163 (16 sch)	12,353 (32 sch)	-.483 (*SD*=.902)	-.526 (*SD*=.872)	.043	.05
Not Under-represented Race/ Ethnicity with Non-Missing Baseline Test Scores 2018-19	Pct Economically Disadvantaged	7,219 (16 sch)	13,240 (29 sch)	.385	.420	-.035	-.09
	Pct Underrepresented Race/Ethnicity	7,219 (16 sch)	13,240 (29 sch)	.000	.000	.000	.00
	ELA Baseline Z-Score	7,219 (16 sch)	13,240 (29 sch)	.070 (*SD*=.967)	.156 (*SD*=.967)	-.086	-.09
	Math Baseline Z-Score	7,219 (16 sch)	13,240 (29 sch)	.219 (*SD*=.890)	.311 (*SD*=.992)	-.092	-.10

Note: Effect sizes were calculated using Hedges' *g* for continuous variables and Cox's index for dichotomous variables.

Table III-12. Baseline Equivalence for the College Coursetaking Analytic Samples

Sample	Variable	Treat N	Comp N	Adj. Treatment Mean	Unadj. Comparison Mean	Difference (Beta)	Effect Size (SD)
All Grades 10–12 Students Pooled	Pct Economically Disadvantaged	20,929 (16 sch)	41,628 (32 sch)	.627	.593	.034	.09
	Pct Underrepresented Race/Ethnicity	20,929 (16 sch)	41,628 (32 sch)	.509	.483	.026	.06
	ELA Baseline Z-Score	20,929 (16 sch)	41,628 (32 sch)	-.192 (*SD*=.971)	-.188 (*SD*=.985)	-.004	.00
	Math Baseline Z-Score	20,929 (16 sch)	41,628 (32 sch)	-.082 (*SD*=.967)	-.089 (*SD*=.967)	.008	.01
All Grades 10–12 Students 2018-19	Pct Economically Disadvantaged	10,192 (16 sch)	20,524 (32 sch)	.610	.617	-.007	-.02
	Pct Underrepresented Race/Ethnicity	10,192 (16 sch)	20,524 (32 sch)	.498	.477	.021	.05
	ELA Baseline Z-Score	10,192 (16 sch)	20,524 (32 sch)	-.155 (*SD*=.957)	-.170 (*SD*=.982)	.015	.02
	Math Baseline Z-Score	10,192 (16 sch)	20,524 (32 sch)	-.058 (*SD*=.917)	-.072 (*SD*=1.02)	.014	.02
All Grades 10–12 Students 2019-20	Pct Economically Disadvantaged	10,737 (16 sch)	21,104 (32 sch)	.643	.570	.073	.19
	Pct Underrepresented Race/Ethnicity	10,737 (16 sch)	21,104 (32 sch)	.520	.490	.030	.07
	ELA Baseline Z-Score	10,737 (16 sch)	21,104 (32 sch)	-.226 (*SD*=.983)	-.206 (*SD*=.988)	-.020	-.02
	Math Baseline Z-Score	10,737 (16 sch)	21,104 (32 sch)	-.104 (*SD*=.920)	-.106 (*SD*=1.02)	.001	.00

Note: Effect sizes were calculated using Hedges' *g* for continuous variables and Cox's index for dichotomous variables.

Table III-13. Baseline Equivalence for the Pooled College Coursetaking Subgroup Analytic Samples

Sample	Variable	Treat N	Comp N	Adj. Treatment Mean	Unadj. Comparison Mean	Difference (Beta)	Effect Size (SD)
EDS Grades 10–12 Students Pooled	Pct Economically Disadvantaged	12,758 (16 sch)	24,685 (32 sch)	1.000	1.000	.000	.00
	Pct Underrepresented Race/Ethnicity	12,758 (16 sch)	24,685 (32 sch)	.695	.653	.042	.12
	ELA Baseline Z-Score	12,758 (16 sch)	24,685 (32 sch)	-.432 (*SD*=.930)	-.459 (*SD*=.926)	.026	.03
	Math Baseline Z-Score	12,758 (16 sch)	24,685 (32 sch)	-.329 (*SD*=.908)	-.402 (*SD*=.922)	.073	.08
Not EDS Grades 10–12 Students Pooled	Pct Economically Disadvantaged	8,171 (12 sch)	15,886 (21 sch)	.000	.000	.000	.00
	Pct Underrepresented Race/Ethnicity	8,171 (12 sch)	15,886 (21 sch)	.200	.237	-.037	-.13
	ELA Baseline Z-Score	8,171 (12 sch)	15,886 (21 sch)	.207 (*SD*=.937)	.205 (*SD*=.935)	.001	.00
	Math Baseline Z-Score	8,171 (12 sch)	15,886 (21 sch)	.336 (*SD*=.859)	.366 (*SD*=.974)	-.030	-.03
Underrepresented Race/Ethnicity (Grades 10–12)	Pct Economically Disadvantaged	9,928 (16 sch)	20,126 (32 sch)	.832	.800	.032	.13
	Pct Underrepresented Race/Ethnicity	9,928 (16 sch)	20,126 (32 sch)	1.000	1.000	.000	.00
	ELA Baseline Z-Score	9,928 (16 sch)	20,126 (32 sch)	-.515 (*SD*=.916)	-.555 (*SD*=.871)	.040	.05
	Math Baseline Z-Score	9,928 (16 sch)	20,126 (32 sch)	-.449 (*SD*=.890)	-.518 (*SD*=.869)	.069	.08
Not Underrepresented Race/Ethnicity (Grades 10–12)	Pct Economically Disadvantaged	11,001 (16 sch)	21,458 (29 sch)	.416	.399	.017	.04
	Pct Underrepresented Race/Ethnicity	11,001 (16 sch)	21,458 (29 sch)	.000	.000	.000	.00
	ELA Baseline Z-Score	11,001 (16 sch)	21,458 (29 sch)	.072 (*SD*=.961)	.155 (*SD*=.961)	-.083	-.09
	Math Baseline Z-Score	11,001 (16 sch)	21,458 (29 sch)	.222 (*SD*=.879)	.313 (*SD*=.979)	-.090	-.10

Table III-13. Baseline Equivalence for the Pooled College Coursetaking Subgroup Analytic Samples (continued)

Sample	Variable	Treat N	Comp N	Adj. Treatment Mean	Unadj. Comparison Mean	Difference (Beta)	Effect Size (SD)
Grades 11–12 Pooled	Pct Economically Disadvantaged	13,216 (16 sch)	26,638 (32 sch)	.612	.582	.030	.08
	Pct Underrepresented Race/Ethnicity	13,216 (16 sch)	26,638 (32 sch)	.506	.483	.023	.05
	ELA Baseline Z-Score	13,216 (16 sch)	26,638 (32 sch)	-.149 (*SD*=.970)	-.154 (*SD*=.983)	.005	.01
	Math Baseline Z-Score	13,216 (16 sch)	26,638 (32 sch)	-.050 (*SD*=.924)	-.060 (*SD*=1.02)	.010	.01
Grade 10 Pooled	Pct Economically Disadvantaged	7,713 (16 sch)	14,990 (32 sch)	.653	.612	.042	.11
	Pct Underrepresented Race/Ethnicity	7,713 (16 sch)	14,990 (32 sch)	.515	.483	.031	.08
	ELA Baseline Z-Score	7,713 (16 sch)	14,990 (32 sch)	-.266 (*SD*=.969)	-.250 (*SD*=.986)	-.016	-.02
	Math Baseline Z-Score	7,713 (16 sch)	14,990 (32 sch)	-.136 (*SD*=.906)	-.140 (*SD*=1.02)	.004	.00

Note: Effect sizes were calculated using Hedges' *g* for continuous variables and Cox's index for dichotomous variables.

III.1.2.5. Average College Credits Earned by Graduates in 2018–19

Outcome 5 examined the impact of the CCRE program on students earning college credit. For our analysis, within the treatment and comparison schools, students could receive college credit either by successfully completing a College Credit Plus course or by scoring a 3 or higher on an Advanced Placement exam. The confirmatory analysis focused on the impact of the average combined number of college credits earned from CCP and AP for students graduating from high school in 2018–19. To better understand patterns of students earning college credits we also ran several sub-analyses on the following outcomes: 1) the average number of dual credits earned, 2) the average number of AP credits earned, 3) whether a student graduated with any dual credit, 4) whether a student graduated with three or more dual credits, and 5) whether a student graduated with any AP credit equivalent.

Outcome Variable. The number of dual credits earned and student scores on AP exams come from two separate ODE files and require different procedures for calculating the total college credits. The confirmatory outcome variable is the sum of dual credits and equivalent AP credits; we discuss each calculation separately in the following paragraphs.

- *Dual credits earned (CCP).* The graduation core file contained multiple records for each student, with a row for each subject area (such as English or CTE). The file recorded the number of dual credits a student

earned in each subject area. We calculated each student's total dual credits earned by taking the sum of the dual credits earned across all subject areas. We also used these values to calculate dichotomous variables indicating whether a student earned any dual credit and whether a student earned three or more dual credits (a threshold used in Ohio accountability Prepared for Success measures[7]).

- *AP Credit Equivalent.* To determine AP credit equivalents, we used AP test data from ODE. Each record in the file corresponded to an AP test subject and score taken by students during high school. ODE did not report the college credit equivalents for AP test scores. We used a crosswalk of AP college credit equivalents to determine the number of college credits students earn for different AP scores at Ohio University. This crosswalk is available upon request.

Analytic Sample. ODE does not track the number of dual credits students earned each year of high school. Schools and districts are only required to report the number of dual credits that students earned throughout high school at the time of student graduation. As such, our analytic sample included twelfth grade students who appeared in the graduation core file from the same 48 treatment and comparison schools as the other analyses. Because college credits earned was a cumulative outcome, we did not place any ADM restrictions on the sample, considering a student as enrolled in the sample school that was attached to their graduation record.

Baseline Equivalence. As shown in Table III-14 (page 33), the samples were equivalent at baseline.

As shown in Table III-15 (page 33), baseline equivalence existed at the student level for the pooled sample; we also found equivalence for each of the specific years (not shown).

III.1.3. Analytic Approach

We used hierarchical linear modeling (HLM) (Raudenbush & Bryk, 1992) as the general analytic framework to account for the nested structure of the data. For all analyses, students were nested within schools. In general, these models seek to answer the question, "Is there an overall treatment effect of the intervention on relevant student outcomes for schools that implement the model relative to their comparison school counterparts?" Consequently, our models included a fixed treatment effect at level 2, which was the primary effect of interest. The models also included the baseline measures that are designated as the variables on which baseline equivalence is established.

We adjusted for multiple comparisons within each of the three domains as appropriate. Outcomes 1 & 2 were subject to adjustment because they fell within the same domain. Outcome 3 was the only outcome in its domain, so it was not adjusted for multiple comparisons. Finally, Outcomes 4 & 5 were also within the same domain and were subject to adjustment. We used significance tests that account for the potential false discovery rate (Benjamini & Hochberg, 1995) for outcomes within the same domain. We did not perform adjustments for exploratory analyses.

Model Specifications. The following model includes the general specifications below for all outcomes.

Level 1 (student level)

$$y_{ij} = \beta_{0j} + \sum_{p=1}^{p} \beta_{pj} COV_{pij} + e_{ij}$$

where:

y_{ij} = outcome of interest for student i in school j;

COV_{pij} = p-th student-level covariate included in the final model;

β_{0j} = adjusted mean outcome of interest for school j controlling for differences in student-level covariates;

β_{pj} = the association between the p-th student-level covariate and outcome of interest; and

e_{ij} = random effect of student i in school j assumed to be distributed with a mean of zero and variance of σ_e^2.

Level 2 (school level)

$$\beta_{0j} = \gamma_{00} + \gamma_{01}T_j + \sum_{} \gamma_{0(k+2)}X_j^k + u_{0j}$$

$$\beta_{pj} = \gamma_{p0}$$

where:

T_j = the indicator variable showing whether school *j* was a treatment (1) or matched comparison school (0);

X_j^k = k-th (k=1,2,...,K) school-level measure used in the matching process;

γ_{00} = adjusted mean of the outcome of interest in the comparison group;

γ_{01} = overall fixed-treatment effect adjusted for the covariates;

γ_{p0} = pooled within-school regression coefficient for student-level covariate *p*; and

u_{0j} = random effect of school j, assumed to be distributed with a mean of zero and variance of ; note that this term is also assumed to be independent of the student-level error term, e_{ij}.

We adapted this generic model to each outcome, and we estimated using a two-tailed significance test at the $p < .05$ significance level. The coefficient represents the overall treatment effect in each model.

The variables included in the impact model are listed in Table III-16 (page 34).

III.1.3.1. Subgroup Analyses

For each outcome, we repeated the analytic model described above for four different demographic subgroups: 1) economically disadvantaged students, 2) not economically disadvantaged students, 3) students from underrepresented race/ethnic groups, and 4) students from not underrepresented race/ethnic groups. For the college coursetaking outcomes, we also ran the analyses for three different combinations of grade levels: 1) Grades 10–12 (the primary analyses), 2) Grades 11–12, and 3) Grade 10. For each subgroup analysis, we replaced the baseline school-level variables with measures specific to the subgroup. For example, all analyses of economically disadvantaged students included baseline covariates specific to that group (e.g., the school-level percentage of economically disadvantaged students on track in ninth grade).

III.1.3.2. Missing Data

The administrative data from Ohio Department of Education had little missingness for the variables included in the analyses. As such, we decided to use case-wise deletion for students with any missing data. We did not use any imputation procedures.

III.2. MEASURING EARLY COLLEGE DESIGN PRINCIPLE IMPLEMENTATION

This sub-study was intended to examine the impact of CCRE on schools, tracking changes over time using a survey administered to staff in treatment schools. The survey was administered in the fall of 2016, which was intended to serve as a baseline, and then again in the falls of 2017, 2018, and 2019. In the last two years, questions were added about perceived impact and sustainability. The content of the survey is discussed in more depth below.

[7] http://education.ohio.gov/Topics/Data/Report-Card-Resources/Prepared-for-Success-Component

Table III-14. Baseline Equivalence for the College Credits Earned Analytic Sample

Sample	Variable	Treat N	Comp N	Adj. Treatment Mean	Unadj. Comparison Mean	Difference (Beta)	Effect Size (SD)
All Grad Core Students Pooled	Pct Economically Disadvantaged	6,341 (16 sch)	13,039 (32 sch)	.588	.568	.020	.05
	Pct Underrepresented Race/Ethnicity	6,341 (16 sch)	13,039 (32 sch)	.499	.478	.021	.05
	ELA Baseline Z-Score	6,341 (16 sch)	13,039 (32 sch)	-.123 (*SD*=.943)	-.112 (*SD*=.964)	-.011	-.01
	Math Baseline Z-Score	6,341 (16 sch)	13,039 (32 sch)	-.127 (*SD*=.890)	-.131 (*SD*=.967)	.004	-.01
All Grad Core Students 2018-19	Pct Economically Disadvantaged	3,060 (16 sch)	6,424 (32 sch	.574	.590	-.016	-.04
	Pct Underrepresented Race/Ethnicity	3,060 (16 sch)	6,424 (32 sch)	.503	.474	.029	.07
	ELA Baseline Z-Score	3,060 (16 sch)	6,424 (32 sch)	-.143 (*SD*=.921)	-.081 (*SD*=.953)	-.062	-.07
	Math Baseline Z-Score	3,060 (16 sch)	6,424 (32 sch)	-.210 (*SD*=.847)	-.166 (*SD*=.904)	-.044	-.05
All Grad Core Students 2019-20	Pct Economically Disadvantaged	3,281 (16 sch)	6,615 (32 sch)	.605	.547	.058	.14
	Pct Underrepresented Race/Ethnicity	3,281 (16 sch)	6,615 (32 sch)	.496	.482	.014	.03
	ELA Baseline Z-Score	3,281 (16 sch)	6,615 (32 sch)	-.099 (*SD*=.963)	-.141 (*SD*=.973)	.042	.04
	Math Baseline Z-Score	3,281 (16 sch)	6,615 (32 sch)	.004 (*SD*=.915)	-.048 (*SD*=1.02)	.052	.06

Note: Effect sizes were calculated using Hedges' *g* for continuous variables and Cox's index for dichotomous variables.

Table III-15. Baseline Equivalence for the Pooled College Credits Earned Subgroup Analytic Sample

Sample	Variable	Treat N	Comp N	Adj. Treatment Mean	Unadj. Comparison Mean	Difference (Beta)	Effect Size
EDS Grad Core Students Pooled	Pct Economically Disadvantaged	3,560 (16 sch)	7,410 (32 sch)	1.000	1.000	.000	.00
	Pct Underrepresented Race/Ethnicity	3,560 (16 sch)	7,410 (32 sch)	.707	.668	.039	.11
	ELA Baseline Z-Score	3,560 (16 sch)	7,410 (32 sch)	-.365 (*SD*=.907)	-.373 (*SD*=.917)	.008	.01
	Math Baseline Z-Score	3,560 (16 sch)	7,410 (32 sch)	-.333 (*SD*=.874)	-.404 (*SD*=.877)	.071	.08
Not EDS Grad Core Students Pooled	Pct Economically Disadvantaged	2,781 (12 sch)	5,307 (19 sch)	.000	.000	.000	.00
	Pct Underrepresented Race/Ethnicity	2,781 (12 sch)	5,307 (19 sch)	.252	.229	.023	.08
	ELA Baseline Z-Score	2,781 (12 sch)	5,307 (19 sch)	.195 (*SD*=.922)	.233 (*SD*=.915)	-.043	-.05
	Math Baseline Z-Score	2,781 (12 sch)	5,307 (19 sch)	.159 (*SD*=.864)	.287 (*SD*=.939)	-.128	-.14
Underrepresented Race/Ethnicity Grad Core Students Pooled	Pct Economically Disadvantaged	2,915 (16 sch)	6,239 (32 sch)	.812	.794	.018	.07
	Pct Underrepresented Race/Ethnicity	2,915 (16 sch)	6,239 (32 sch)	1.000	1.000	.000	.00
	ELA Baseline Z-Score	2,915 (16 sch)	6,239 (32 sch)	-.434 (*SD*=.897)	-.478 (*SD*=.856)	.044	.05
	Math Baseline Z-Score	2,915 (16 sch)	6,239 (32 sch)	-.457 (*SD*=.853)	-.520 (*SD*=.833)	.063	.07
Not Underrepresented Race/Ethnicity Grad Core Students Pooled	Pct Economically Disadvantaged	3,426 (16 sch)	6,785 (29 sch)	.380	.361	.019	.05
	Pct Underrepresented Race/Ethnicity	3,426 (16 sch)	6,785 (29 sch)	.000	.000	.000	.00
	ELA Baseline Z-Score	3,426 (16 sch)	6,785 (29 sch)	.117 (*SD*=.936)	.224 (*SD*=.935)	-.107	-.11
	Math Baseline Z-Score	3,426 (16 sch)	6,785 (29 sch)	.161 (*SD*=.860)	.274 (*SD*=.924)	-.113	-.13

Note: Effect sizes were calculated using Hedges' *g* for continuous variables and Cox's index for dichotomous variables.

Table III-16. Variables Included in Impact Model

School-Level Variables	Student-Level Variables
• % of 9th Grade Students On Track (2015-16) • % of Students Taking a CCP Course (2015-16) • % of Students Taking an AP Course (2015-16) • Mean Number of College Credits Earned (CCP and AP) (Graduates in 2015-16) • Dropout Rate (2015-16) • % Economically Disadvantaged (2015-16) • % Underrepresented Race/Ethnicity (2015-16) • Enrollment in Grades 9–12 in 1000s of Students (2015-16)	• Economically Disadvantaged (Yes/No) • Underrepresented Race/Ethnicity (Yes/No) • Gender • Disability Status (Yes/No) • Limited English Proficient Status (Yes/No) • Math Baseline Z-Score • ELA Baseline Z-Score • Student Had Graduation Points Prior to 9th Grade (Yes/No)[8]

III.2.1. Sample

During the survey window, the seven CCRE district coordinators and a data manager at each school oversaw the distribution of survey links and other aspects of administering the survey. Certified staff members from each of the 16 participating schools were provided the opportunity to take the survey. Table III-17 summarizes the response rate at each school for the four project years. Fifteen of the sixteen schools met the expected response rate threshold of 50%, with an overall response rate of 59% across all program schools. SERVE Center provided school-level summary data to each participating site as formative feedback and for use in planning. Each school with a response rate over 50% received $1,000 for each survey administration.

III.2.2. Measures

The staff survey was developed during Fall 2016 utilizing, as a starting point, items from other i3 grant projects which were aligned to the Early College Design Principles articulated in the CCRE project proposal. Scales measuring aspects of

Table III-17. Survey Response Rate

Year	Total Survey Respondents	Total Certified Staff Eligible (Reported by District Coordinators)	Overall Response Rate	Response Rate Range by Site
Year 1 (2016)	836	1,052	79%	50%-100% (All 16 schools met threshold)
Year 2 (2017)	746	1,056	71%	23%-100% (15/16 schools met 50% threshold)
Year 3 (2018)	760	1,055	72%	55%-97% (All 16 schools met threshold)
Year 4 (2019)	619	1,056	59%	50%-100% (15/16 schools met 50% threshold)

[8]Only included in the models for the on-track analyses, Outcomes 1 and 2.

each Design Principle from previous projects were adapted to reflect the expected early college implementation outcomes in CCRE. Staff members from Columbus State and two non-program schools in Columbus piloted and vetted the items prior to the first administration. A table summarizing the scales and their reliability can be found in Appendix C.

III.2.3. Survey Analysis

For most questions on the survey, each scale was reported as an average of all responses for the school. For questions that were presented only to school administrators and counselors, an average was calculated for each school.

For questions posed to administrators and counselors asking them to estimate the percentage of students in their school to which a certain statement applies (e.g., "enrolled in one or more honors courses"), responses were often not consistent across respondents from the same school, potentially reflecting differing levels of familiarity with students' coursetaking and college preparatory activities. To obtain a representative response from each school, the following values were considered in the order listed below. If value 1 existed, it was used as the school's response. Otherwise, value 2 was used, and so on.

1. The overall mode
2. If no overall mode and only one counselor response, the counselor's response
3. If no overall mode and more than one counselor, mode among counselor responses
4. If no mode among counselors, the response of the counselor who has been at the school the longest
5. If counselors did not differ in time at school, the lower response value
6. If no responses from a counselor, the response of the administrator who has been at the school the longest
7. If administrators did not differ in time at school, the lower response value

Generalized Estimating Equations (GEE) analysis was used to test for changes in average responses from the baseline survey administration (Year 1) to the Year 4 results. GEE analysis accounts for the clustering of staff within schools and allows us to address issues associated with the anonymity of the survey. Many of the surveys were completed by the same staff across the program years (which meant that the survey responses across years were not independent of each other) but, because the survey was anonymous, responses could not be linked to the same respondents across years. GEE analysis addresses the violation of independence due to repeat respondents by employing empirically estimated standard errors, which are robust to violations of independence. Additionally, like a multi-level model, a GEE model accounts for the clustering of survey respondents within schools, thereby accounting for the other source of dependence between responses. GEE analysis was used for all survey questions except those that were presented to only administrators and counselors, with the survey year as the sole predictor and with responses nested within schools. Because the administrator/counselor-only responses were aggregated to the school level, nesting was not a concern for those specific questions, which were compared from baseline to the final year using paired-samples t-tests.

For the analysis of principal responses between CCRE and comparison schools, the evaluation team used a two-sample *t*-test to assess differences between groups. For comparing the growth of CCRE schools to comparison schools, the team used a repeated-measures analysis of variance (ANOVA) test.

III.3. CASE STUDIES

To describe school-level implementation in more detail, the evaluation team conducted case studies in six CCRE schools.

III.3.1. Sample

For the case studies, the evaluation team worked with the project staff to identify six schools in five districts for a series of site visits. The sites were purposefully selected to represent varying demographics, urbanicity, and implementation activities (Table III-18 page 36).

Table III.18. Site Visit Schools Demographics

	Enrollment	Economically Disadvantaged	Percent "White, Non-Hispanic" or API	4-Year Graduation Rate	Prepared for Success Grade*	Achievement Index*	Progress Grade*
School A	540	53.9%	39.4%	97.9%	F	59.8% (D)	C
School B	743	100.0%	42.5%	96.4%	F	65.5% (D)	A
School C	1313	77.5%	48.1%	83.7%	F	53.4% (D)	D
School D	799	61.9%	78.7%	90.7%	F	70.7% (C)	B
School E	955	100.0%	20.7%	78.6%	F	49.0% (F)	C
School F	832	98.4%	27.0%	78.5%	F	52.5% (F)	B
State Average		49.4%	69.6%				

Source: 2018-19 Ohio School Report Cards[9]

III.3.2. Data Sources

The case studies incorporated data from a variety of sources including: 1) site visits with interviews and observations, 2) a review of relevant documents, 3) interviews with project and district staff, 4) data collected to assess fidelity of implementation, and 5) implementation survey data.

III.3.2.2. Site Visits

SERVE Center staff visited each site in fall 2017, 2018, and 2019; visits included a full day of on-site interviews with teachers, counselors, principals, and other key staff for CCRE. The visits also included student focus groups and classroom observations of teachers participating in CCRE activities. Table III-19 (page 37) shows the data collected across the six schools during site visits.

The semi-structured interviews included questions focused on understanding implementation of the CCRE supports as well as school-level implementation of the Early College Design Principles.

III.3.2.2. Document Review

The evaluation team collected documents from all schools including reports outlining their strategic plans and the pathways they were developing. Additionally, we used school-level administrative data from the Ohio Department of Education to provide implementation context.

III.3.2.3. Project and District Staff Interviews

Across the five project years, the evaluation team conducted a total of 70 interviews with Columbus State, JFF, ESC, and district staff. These interviews focused primarily on implementation at the program or district-level but also included reflections on implementation at individual schools.

III.3.2.4. Implementation Support Data

As mentioned in Section II, the evaluation team worked with the project staff to identify indicators with targeted levels of implementation for each of the Key Components shown in the logic model; these indicators served as measures of Fidelity of Implementation (FOI). Individuals responsible for

[9] https://reportcard.education.ohio.gov

Table III-19. Qualitative Interviews Summary

Role Type	Year 2 (2017-18)	Year 3 (2018-19	Year 4 (2019-20)
Columbus State CC Staff (project leads and advisors)	12	9	13
Districts			
District Staff (coordinators and CCRE Cabinet members)	11	7	11
District Instructional Coaches	4	1	2
Schools			
Principals and Assistant Principals	9	7	9
Counselors	9	8	8
Teachers	17	19	17
Students (in focus groups)	37	31	21
Site-Based Advisors (I Know I Can and Communities in Schools)	0	6	6
Total	99	88	87

providing the implementation supports entered these data into an online spreadsheet that was used for tracking project implementation. These implementation data were analyzed annually to assess FOI (results are included in Appendix A). These data were also used in the case studies to examine levels of participation in program supports.

III.3.2.5. Staff Survey Data

The staff survey was described in Section III.2, above. In addition to looking at changes across the entire set of schools, we developed school-level survey reports that were incorporated into the case studies.

II.3.3. Analyses

Following each site visit, the interviews were transcribed and entered into Atlas.ti. SERVE staff coded the transcripts using prespecified codes that were aligned to aspects of implementation. Each year the team jointly coded a set of transcripts to ensure common understanding for the codes.

After the final site visits were complete, research team members used the collected information, coupled with information from the survey, project records, and other interviews, to create a case study write-up for each school. Each write-up, which averaged about 25 pages, included the school's background information, a description of the implementation supports the school received, a description of how the school began the work of the project, a description of how the school implemented the Design Principles over time, perceptions of what the impact of the project has been on the school and a discussion of how the school staff were thinking about sustainability. The team then conducted a cross-case analysis that summarized patterns of implementation across the six schools. Results from this cross-case analysis are included in Section V.

Section IV: Impacts on Students

The intent of CCRE was to increase the college and career readiness of students by implementing the Early College Design Principles. The study assessed the extent to which the project was successful by looking at the impact of CCRE on a core set of high school student outcomes: 1) students' successful progression in a college preparatory course of study, 2) the number of students staying in school, and 3) student enrollment and success in college-level courses. This section presents results from the quasi-experimental impact study. Key findings presented in this section include:

- There was a statistically significant positive impact of more than five percentage points on the percentage of students who were performing well on exams associated with successful progression in a college preparatory course of study.
- There was no impact on the percentage of students dropping out.
- There was a statistically significant positive impact on the percentage of students enrolled in college credit courses but not a significant impact on the total number of credits earned.

As described in more depth in the methodology section, the impact study used a quasi-experimental design in which CCRE schools were matched to non-participating schools. Both sets of schools started with similar levels of the outcomes and with similar student demographic characteristics (see Table III.2 in Section III for the baseline equivalence). Each student sample also exhibited baseline equivalence on key characteristics. Section III also describes how the measures for each outcome were defined and created; here, we will include some of the key points, but readers are encouraged to refer to the methodology section for more detail.

IV.1. IMPACT ON SUCCESSFUL COMPLETION IN A COLLEGE PREPARATORY COURSE OF STUDY

This outcome explored the extent to which CCRE increased the number of students who are ready for college and career. We looked at this at two points in time, ninth grade and tenth grade. Table IV-1 summarizes how the two outcomes are defined by time point.

It is important to note that we could not look at these outcomes in the 2019–20 school year because no end-of-

Table IV-1: College Readiness Outcomes

Grade	Years Assessed	Outcome definition	Sample Definition
9th	2017-18; 2018-19	% of students earning at least five graduation points on end-of-course exams with at least two in Algebra I or Math I and at least two in English I	All 9th graders with at least .95 ADM[a] at a sample school or who dropped out of a sample school in the given year
10th	2018-19	% of students earning at least 15 graduation points on end-of-course exams with at least four points in math, English, and science/social studies	All 10th graders with at least .95 ADM at a sample school or who dropped out in the given year

[a] Average Daily Membership (ADM), which designates the proportion of the school year students were enrolled at each Ohio public school

course exams were administered in the spring of 2020 due to the COVID-19 pandemic.

IV.1.1. Impact on Ninth Grade College Readiness

The confirmatory analysis for Outcome 1 measured the impact of students earning enough graduation points to be considered "on track" for high school graduation by the end of ninth grade. As shown in Table IV-2, there was a statistically significant, positive impact on ninth grade students' on-track status for the pooled (or combined two-year) sample, as well as in each individual year. The combined impact of Years 2 and 3 of 5.8 percentage points represents 449 more students on track in the treatment schools than in the comparison schools across the two school years.

Subgroup Analyses. We ran subgroup analyses on the combined Year 2 and Year 3 samples to see if there were differential impacts on students from different demographic groups. We looked at five subgroups: 1) all students, 2) economically disadvantaged students, 3) not economically disadvantaged students, 4) students from underrepresented racial/ethnic groups, and 5) students not from underrepresented racial/ethnic groups. Table IV-3 (page 40) summarizes the outcomes by subgroup. We found little variance in subgroup impacts, which ranged from 4.0 to 5.0 percentage points. As a reminder, some schools in the sample did not have any non-economically disadvantaged students or students not from underrepresented race/ethnic groups in either the baseline or the outcome year, which led to subgroup impact estimates with means below the overall impact estimate. The number of schools included in the sample is included under the student sample size in Table IV-3.

We also tested impacts on students who did not earn any EOC graduation points prior to attending high school (such as by taking Algebra I in eighth grade). This was an important subgroup to test to eliminate a potential alternative explanation for the results—that the impacts were driven by treatment students coming to ninth grade more likely to have earned graduation points before high school than their comparison counterparts. The results in Table IV-4 (page 40) show that this was *not* the case; the subsample of students with no pre-high school graduation points saw a 6.1 percentage point impact. In addition, the share of students who earned graduation points in eighth grade was very close in the two groups of schools: 20.2% in the treatment group and 19.6% in the comparison group.

IV.1.2. Impact on Tenth Grade College Readiness

The confirmatory analysis for Outcome 2 corresponds to the impact of students earning enough graduation points to be considered "on track" for high school graduation by the end of tenth grade. As shown in Table IV-5 (page 40), there was

Table IV-2. Summary of Ninth Grade College and Career Readiness Impacts in Years 2 & 3 (Pooled, 2017-18 & 2018-19)

Outcome	Treat N (in 16 schools)	Comp N (in 32 schools)	Adjusted Treatment Mean	Unadjusted Comparison Mean	Impact Estimate	Effect Size (Cox's Index)	*p* Value
9th Grade On Track (Pooled)	7,749	14,481	60.2%	54.4%	+5.8 pp**	.10 *SD*	.003
9th Grade On Track in Year 2 (2017-18)	3,919	7,328	60.8%	55.5%	+5.3 pp*	.09 *SD*	.021
9th Grade On Track in Year 3 (2018-19)	3,830	7,153	59.3%	53.3%	+6.0 pp**	.11 *SD*	.003

*Statistically significant at $p < .05$; **Statistically significant at $p < .01$. Main impact was statistically significant after adjusting for multiple comparisons.

Table IV-3. Summary of Ninth Grade On-Track Impacts on Combined Sample in Years 2 & 3 (2017-18 & 2018-19), by Subgroup

Subgroup	Treat N	Comp N	Adjusted Treatment Mean	Unadjusted Comparison Mean	Impact Estimate	Effect Size (Cox's Index)	*p* Value
All Students	7,749 (16 sch)	14,481 (32 sch)	60.2%	54.4%	+5.8 pp**	.14 *SD*	.003
Economically Disadvantaged	5,074 (16 sch)	9,474 (32 sch)	46.7%	42.1%	+4.6 pp*	.11 *SD*	.022
Not Economically Disadvantaged	2,675 (12 sch)	4,973 (18 sch)	82.8%	77.8%	+5.0 pp*	.19 *SD*	.010
Underrepresented Race/Ethnicity	3,684 (16 sch)	7,166 (32 sch)	43.1%	38.5%	+4.6 pp*	.12 *SD*	.022
Not Underrepresented Race/Ethnicity	4,065 (16 sch)	7,299 (29 sch)	74.0%	70.0%	+4.0 pp	.12 *SD*	.060

*Statistically significant at $p < .05$; **Statistically significant at $p < .01$.

Table IV-4. Summary of Ninth Grade On-Track Impacts on Students with No Pre-High School Graduation Points – Combined Sample in Years 2 & 3 (2017-18 & 2018-19)

Subgroup	Treat N (16 sch)	Comp N (32 sch)	Adjusted Treatment Mean	Unadjusted Comparison Mean	Impact Estimate	Effect Size (Cox's Index)	*p* Value
All Students	7,749	14,481	60.2%	54.4%	+5.8 pp**	.10 *SD*	.003
No Pre-High School Graduation Points	6,186	11,649	50.9%	44.8%	+6.1 pp**	.11 *SD*	.004

*Statistically significant at $p < .05$; **Statistically significant at $p < .01$.

Table IV-5. Summary of Tenth Grade On-Track Impacts in Year 3 (2018-19)

Subgroup	Treat N	Comp N	Adjusted Treatment Mean	Unadjusted Comparison Mean	Impact Estimate	Effect Size (Cox's Index)	*p* Value
10th Grade On Track in Year 3 (2018–19)	3,422 (16 sch)	6,582 (32 sch)	56.9%	50.4%	+6.5 pp***	.16 *SD*	< .001

*Statistically significant at p < .001. Main impact was statistically significant after adjusting for multiple comparisons.

Table IV-6. Summary of Tenth Grade On-Track Impacts in Year 3 (2018-19), by Subgroup

Subgroup	Treat N	Comp N	Adjusted Treatment Mean	Unadjusted Comparison Mean	Impact Estimate	Effect Size (Cox's Index)	*p* Value
All Students	3,422 (16 sch)	6,582 (32 sch)	56.9%	50.4%	+6.5 pp***	.16 *SD*	< .001
Economically Disadvantaged	2,111 (16 sch)	4,056 (32 sch)	43.4%	37.2%	+6.2 pp***	.16 *SD*	< .001
Not Economically Disadvantaged	1,311 (11 sch)	2,526 (19 sch)	79.0%	71.6%	+7.4 pp*	.24 *SD*	.033
Underrepresented Race/Ethnic	1,584 (16 sch)	3,099 (32 sch)	39.3%	33.3%	+6.0 pp**	.16 *SD*	.005
Not Underrepresented Race/Ethnic	1,838 (16 sch)	3,477 (29 sch)	71.7%	65.6%	+6.1 pp**	.17 *SD*	.004

*Statistically significant at $p < .05$; **Statistically significant at $p < .01$.; ***Statistically significant at $p < .001$.

a statistically significant positive impact of 6.5 percentage points on tenth grade students' on-track status in Year 3. The 6.5 percentage point impact represents an estimated additional 222 students on track in the treatment schools as compared to the comparison schools for this cohort. It should be noted that many of the students in the tenth grade sample in 2018–19 were also part of the ninth grade sample in 2017–18, which saw a similar magnitude impact for ninth grade on-track status. This suggests that students who were on track in ninth grade remained on track in tenth grade as well.

Subgroup Analyses. Table IV-6 summarizes the outcomes by subgroup. The impacts by subgroup were consistently positive, ranging from 5.5 to 6.7 percentage points. The table also shows that there were significant gaps in the rates between different subgroups. For example, economically disadvantaged students were much less likely to be on track than non-economically disadvantaged students.

IV.2. IMPACT ON DROPPING OUT OF SCHOOL

CCRE was intended to improve students' engagement in school and thus, potentially, keep more students in school. We measured this by looking at the percentage of students who dropped out of school in the 2018–19 school year; data for the 19–20 school year were not available as of the writing of this report. The confirmatory outcome utilized the pooled sample (the two years combined); we also report the findings for each year separately. As a reminder, this sample included students who were missing baseline achievement scores with baseline equivalence shown at the school-level on a previous cohort of students (see section III.1.2.3 for a more in-depth discussion of the outcome and sample definition and see Table B-3 for representativeness of this sample).

The confirmatory analysis for Outcome 3 corresponded to the impact of students dropping out of school in 2018–19. Table IV-7 (page 42) summarizes the findings. Although the estimated rate of dropping out was lower in the CCRE schools by 0.7 percentage points, there was not a statistically significant program impact on dropout rate. Note that in the tables about dropout rates that a negative impact on the rate is better, signaling a lower dropout rate.

Subgroup Analyses. We ran a sensitivity analysis of the dropout outcome for all students with non-missing data (baseline equivalence is shown for the students in

Table IV-7. Summary of Dropout Impacts in Year 3 (2018-19)

Outcome	Treat N (16 sch)	Comp N (32 sch)	Adjusted Treatment Mean	Unadjusted Comparison Mean	Impact Estimate	Effect Size (Cox's Index)	*p* Value
Dropping Out of School (2018-19)	14,875	27,845	3.1%	3.8%	-0.7 pp	-.12 *SD*	.470

No differences were statistically significant.

Table IV-8. Summary of Dropout Impacts on Subgroups in Year 3 (2018-19), by Subgroup

Subgroup	Treat N	Comp N	Adjusted Treatment Mean	Unadjusted Comparison Mean	Impact Estimate	Effect Size (Cox's Index)	*p* Value
All Students with No Missing Data[10]	13,382 (16 sch)	25,593 (32 sch)	2.9%	3.5%	-0.6 pp	-.12 *SD*	.480
Economically Disadvantaged	8,205 (16 sch)	16,054 (32 sch)	4.1%	4.7%	-0.6 pp	-.08 *SD*	.495
Not Economically Disadvantaged	5,177 (12 sch)	9,539 (20 sch)	1.5%	1.4%	+0.1 pp	.03 *SD*	.873
Underrepresented Race/ Ethnic	6,163 (16 sch)	12,353 (32 sch)	3.4%	4.4%	-1.0 pp	-.17 *SD*	.286
Not Underrepresented Race/Ethnic	7,219 (16 sch)	13,240 (29 sch)	2.3%	2.6%	-0.3 pp	-.03 *SD*	.738

No differences were statistically significant.

this analytic sample in Table III-10). We also conducted subgroup analyses using students with non-missing data to see if there were differential impacts on students representing various demographic characteristics. We looked at five subgroups: a) all students with non-missing data, b) economically disadvantaged, c) not economically disadvantaged, d) underrepresented race/ethnic groups, and e) not underrepresented race/ethnic groups. Unlike the confirmatory analysis, we ran each of these analyses only for students with no missing data. Table IV-8 summarizes the outcomes by subgroup. Like the confirmatory analysis, none of the subgroup analyses were statistically significant.

IV.3. IMPACT ON COLLEGE COURSE ENROLLMENT

A key goal of CCRE was increasing the number of students enrolling in college courses. This outcome looked at the percentage of students in grades 10–12[11] taking any college-level course, including both dual-enrollment courses and AP courses. We examined this for both the 2018–19 and 2019–20 school years. The methodology section describes how the outcome and sample were defined in more depth.

The main confirmatory analysis for college course enrollments corresponded to the impact of students taking either CCP or AP courses. As summarized in Table IV-9,

[10] This sample was different than the sample for the confirmatory analyses in Table IV-7, which is why the impact estimates are slightly different.

[11] As a reminder, the project looked only at grades 10-12 because of issues with a new 9th grade school forming in one of the districts in the middle of the study. More information can be found in Section III.1.2.4.

Table IV-9. Summary of College Course Enrollment Impacts in Years 3 & 4 (Pooled Sample and by Year)

Outcome	Treat N (16 sch)	Comp N (32 sch)	Adjusted Treatment Mean	Unadjusted Comparison Mean	Impact Estimate	Effect Size (Cox's Index)	*p* Value
Took Either CCP or AP (pooled)	20,929	41,628	29.9%	22.7%	7.2pp**	.23 *SD*	.003
Took Either CCP or AP (2018-19)	10,192	20,524	29.4%	22.2%	7.2pp**	.23 *SD*	.004
Took Either CCP or AP (2019-20)	10,737	21,104	30.3%	23.2%	7.1pp**	.22 *SD*	.005

**Statistically significant at $p < .01$. Main impact was statistically significant after adjusting for multiple comparisons.

we found a 7.2 percentage point impact on college course enrollment in CCRE schools, with an adjusted 29.9% of the treatment group and 22.7% of the comparison group for students in Grades 10–12 taking college courses in 2018–19. This outcome was significant at the $p < .01$ level with an effect size of .23 *SD*. The individual analyses for Years 3 and 4 yielded nearly identical impact estimates; the increase seen from Year 3 to Year 4 in comparison school college course-taking of approximately one percentage point paralleled a similar adjusted increase in the CCRE schools suggesting that any additional expansion occurring between Years 3 and 4 was likely due to the statewide policy context.

We also looked at each of the college-level course options, CCP and AP, individually for the pooled sample (which combined the two years of data). Summarized in Table IV-10, we found a 7.3 percentage point impact on CCP coursetaking in CCRE schools, a .32 *SD* effect size significant at the $p < .001$ level. There was not a statistically significant impact on AP course enrollment, which is not surprising given that AP courses were not an explicit focus of the CCRE program. However, a non-negative (and positive, although not statistically significant) finding is important because increases in students taking college courses through CCP were not at the expense of AP course enrollments.

Table IV-10. Summary of College Course Enrollment Impacts, by Type of Course (Pooled Sample)

Outcome	Treat N (16 sch)	Comp N (32 sch)	Adjusted Treatment Mean	Unadjusted Comparison Mean	Impact Estimate	Effect Size (Cox's Index)	*p* Value
Took Either CCP or AP (pooled)	20,929	41,628	29.9%	22.7%	+7.2pp**	.23 *SD*	.003
Took CCP (pooled)	20,929	41,628	20.7%	13.4%	+7.3pp***	.32 *SD*	< .001
Took AP (pooled)	20,929	41,628	14.5%	13.5%	+1.0pp	.05 *SD*	.653

**Statistically significant at $p < .01$.; ***Statistically significant at $p < .001$.

[12] The subgroup results produce a somewhat surprising result in that two mutually exclusive groups (e.g., economically disadvantaged and non-economically disadvantaged) can yield impact estimates that are both larger than the total. This difference is not an error but is due to the statistical adjustments to the treatment group proportion that take place in each impact model as well as not all schools having students who are part of every subgroup.

Subgroup Analysis. The sample for the college course enrollment outcome contained students from multiple grade levels and subgroups. For each outcome, we ran 15 subgroup analyses representing three different grade level ranges: 1) Grades 10–12, 2) Grades 11–12, and 3) Grade 10, and five subgroups: 1) all students, 2) economically disadvantaged students, 3) not economically disadvantaged students, 4) students from underrepresented racial/ethnic groups, and 5) students not from underrepresented racial/ethnic groups. Table IV-11 presents the results for our confirmatory outcome of students taking either CCP or AP courses in grades 10–12 by demographic subgroups. As the table shows, the subgroup impact estimates ranged from 6.8 to 9.6 percentage points. We also looked at impacts for each grade span by the different demographic sub-groups. The number of analyses involved makes the tables large; the results can be found as Tables D.1–D.3 in Appendix D and the findings are summarized below.

Students Taking Either CCP or AP Courses. Table D.1 displays the results for students taking either CCP or AP courses in 2018–19. The impacts for all subgroups were statistically significant. For Grades 10–12, the percentage point differences were relatively consistent across all subgroups, ranging from 6.8 to 9.6 percentage points respectively.[12] The comparison of effect sizes across subgroups for all grade level designations also shows larger impacts for economically disadvantaged students and students from underrepresented racial/ethnic groups compared to non-economically disadvantaged students and students not from underrepresented racial/ethnic groups. We interpreted these effect sizes as showing that although the CCRE treatment schools had positive impacts in college course enrollment for all students, the impact on targeted groups was larger in magnitude than in non-targeted groups. For students in Grades 10–12 the effect sizes for economically disadvantaged

Table IV-11: Students Taking Either CCP or AP (Pooled Sample), by Subgroup

Population	Treat N	Comp N	Adj. Treat Mean	Unadj. Comp Mean	Impact Estimate	Effect Size (Cox's Index)	*p* Value
All Students (Grades 10–12)	20,929 (16 sch)	41,628 (32 sch)	29.9%	22.7%	+7.2pp**	0.225	0.003
All Students (Grades 11–12)	13,216 (16 sch)	26,638 (32 sch)	36.3%	29.1%	+7.3pp*	0.201	0.011
All Students (Grade 10)	7,713 (16 sch)	14,990 (32 sch)	18.8%	11.4%	+7.4pp**	0.356	0.003
Economically Disadvantaged (Grades 10–12)	12,758 (16 sch)	24,685 (32 sch)	22.8%	15.1%	+7.7pp**	0.307	0.002
Not Economically Disadvantaged (Grades 10–12)	8,171 (12 sch)	15,886 (21 sch)	43.4%	33.7%	+9.6pp**	0.248	0.008
Underrepresented Race/ Ethnic (Grades 10–12)	9,928 (16 sch)	20,126 (32 sch)	21.2%	14.4%	+6.8pp**	0.286	0.005
Not Underrepresented Race/Ethnic (Grades 10–12)	11,001 (16 sch)	21,458 (29 sch)	39.2%	30.5%	+8.7pp**	0.232	0.004

*Statistically significant at $p < .05$; **Statistically significant at $p < .01$.

students (.31 *SD*) and students from underrepresented racial/ethnic groups (.29 *SD*) were slightly larger than those for non-economically disadvantaged students (.25 *SD*) and students not from underrepresented racial/ethnic groups (.23 *SD*) students. Similarly, effect sizes for tenth grade students were in general larger than those for students in grades 10–12.

Students Taking Only CCP Courses. Table D.2 displays the results for college course enrollment for students who only took College Credit Plus courses. There were statistically significant impacts for all subgroups except for non-economically disadvantaged students. Note that the data included CCP courses taken at any postsecondary institution; although most treatment students took their CCP courses at Columbus State, the results capture courses taken at other institutions as well. Similar to the results for the overall college course enrollment measure, we found larger effect size impacts for the target groups of economically disadvantaged students (.56 *SD*) and students from underrepresented racial/ethnic groups (.49 *SD*) than for the non-targeted groups (.16 *SD* and .28 *SD*, respectively).

Students Taking Only AP Courses. The final analysis explored subgroup impacts on AP course enrollment, summarized in Table D.3. Overall, the AP results did not show much difference between the treatment and comparison schools. However, all impact estimates for both Grades 10–12 and Grades 11–12 were positive, meaning that the adjusted proportion of students taking AP courses in the CCRE treatment schools was higher than those in the comparison schools. We found statistically significant impacts on AP coursetaking for non-economically disadvantaged students. The impact of 7.1 percentage points on AP course enrollment for non-economically disadvantaged students in grades 10–12 was significant at $p <. 05$. This is an interesting finding since there was a null impact on CCP coursetaking for this subgroup.

IV.4. IMPACT ON COLLEGE CREDITS EARNED

While the previous outcome focused on changes in student access, this outcome examined the impact on students earning college credit. Students could receive college credit either by successfully completing a College Credit Plus course or by scoring a 3 or higher on an Advanced Placement exam. The confirmatory analysis focused on the impact of the average combined number of college credits earned from CCP and AP for students graduating from high school in 2018–2019 and in 2019–20. To better understand patterns of students earning college credits we also ran follow-up analyses to look at: 1) the average number of dual credits earned, 2) the average number of AP credit equivalents earned, 3) whether a student graduated with any dual credit, 4) whether a student graduated with three or more dual credits, and 5) whether a student graduated with any AP credit equivalents.

As described in more depth in the methodology section, the Ohio Department of Education only collects data on course credits earned at the point of a student's graduation from high school. As a result, the sample was restricted to high school graduates. This means that the sample for college course enrollment and the sample used for college credits earned was not the same, making comparisons between the two outcomes challenging, although we did attempt some comparisons, as described below.

The number of credits earned through dual enrollment was reported in the high school graduation file. To determine the number of credits earned through an AP exam, we used a crosswalk of AP college credit equivalents used to determine the number of college credits students would earn for different AP scores at Ohio University.

The confirmatory analysis looked at the total average number of college credits earned (through dual credit and through AP equivalents) by graduating students in sample

schools in 2018–19. Shown in Table IV-12, on average, graduates in CCRE schools earned fewer total college credits and dual credits than graduates in the comparison schools. Graduates of CCRE schools earned slightly more AP credit equivalents. None of these differences, however, were statistically significant.

When we looked at the number of college credits earned by type of credit, we saw no statistically significant differences (Table IV-13, page 47).

We also conducted some additional exploratory analyses, measuring additional outcomes related to the number of college credits earned by the graduates in both years. These outcomes were students 1) earning any dual credit, 2) earning three or more dual credits, 3) taking an AP exam, and 4) earning any college credit equivalents by earning a 3 or higher on an AP exam. As shown in Table IV-14 (page 47), there was a statistically significant impact on the percentage of students earning any college credits or any dual credit but no impact on the percentage earning 3 or more credits or any AP credits.

Subgroup Analyses. When we looked at the impact for the confirmatory outcome—number of credits earned—by subgroup, we saw a similar pattern to the overall findings with no statistically significant differences, Table IV-15 (page 48).

IV.5. COMPARING COLLEGE COURSETAKING AND CREDITS EARNED

The finding that CCRE expanded access to college courses for more students but did not increase the overall number of credits earned deserved further exploration. As a result, we conducted additional analysis using the 2018–19 graduates to better understand the connection between students *taking* college-level coursework and students *earning credit* in college-level coursework, represented by Outcomes 4 and 5 respectively. The data limited us to only twelfth grade students who graduated high school, but this extra

Table IV-12. Summary of College Credits Earned, Combined CCP and AP

Outcome	Treat N	Comp N	Adjusted Treatment Mean	Unadjusted Comparison Mean	Impact Estimate (Beta)	Effect Size (Hedges' *g*)	*p* Value
Average College Credits Earned (Combined CCP and AP, pooled)	6,341 (16 sch)	13,039 (32 sch)	4.68 Credits (*SD*=9.68)	5.45 Credits (*SD*=11.55)	-0.77 credits	-.07 *SD*	.369
Average College Credits Earned (Combined CCP and AP, 2018-19)	3,060 (16 sch)	6,424 (32 sch)	4.90 Credits (*SD*=9.55)	5.51 Credits (*SD*=11.16)	-0.61 credits	¬-.06 *SD*	.533
Average College Credits Earned (Combined CCP and AP, 2019-20)	3,281 (16 sch)	6,615 (32 sch)	4.55 Credits (*SD*=9.81)	5.40 Credits (*SD*=11.92)	-0.85 credits	-.09 *SD*	.287

No differences were statistically significant.

Table IV-13. Summary of College Credits Earned (Pooled Sample), by Type of Credit

Outcome	Treat N	Comp N	Adjusted Treatment Mean	Unadjusted Comparison Mean	Impact Estimate (Beta)	Effect Size (Hedges' *g*)	*p* Value
Average College Credits Earned (Combined CCP and AP, pooled)	6,341 (16 sch)	13,039 (32 sch)	4.68 Credits (*SD*=9.68)	5.45 Credits (*SD*=11.55)	-0.77 credits	-.07 *SD*	.369
Average CCP Credits earned (pooled)	6,341 (16 sch)	13,039 (32 sch)	3.62 credits (*SD*=8.39)	4.41 credits (*SD*=10.20)	-0.79 credits	-.08 *SD*	.379
Average AP Credits Earned (pooled)	6,341 (16 sch)	13,039 (32 sch)	1.06 credits (*SD*=3.67)	1.04 credits (*SD*=4.51)	+0.02 credits	.00 *SD*	.935

No differences were statistically significant.

Table IV-14. Summary of Additional Impacts Related to College Credit (Pooled Sample)

Outcome	Treat N	Comp N	Adjusted Treatment Mean	Unadjusted Comparison Mean	Impact Estimate (Beta)	Effect Size (Cox's Index)	*p* Value
HS Graduates Earning Any College Credit (CCP or AP)	6,341 (16 sch)	13,039 (32 sch)	37.3%	32.0%	+5.3pp*	.14 *SD*	.041
HS Graduates Earning Any Dual Credit	6,341 (16 sch)	13,039 (32 sch)	33.9%	27.9%	+6.0pp*	.17 *SD*	.046
HS Graduates Earning 3+ Dual Credits	6,341 (16 sch)	13,039 (32 sch)	29.5%	27.4%	+2.1pp	.06 *SD*	.510
HS Graduates Earning Equivalent College Credit from an AP Exam	6,341 (16 sch)	13,039 (32 sch)	10.8%	9.8%	+1.0pp	.06 *SD*	.562

*Statistically significant at $p < .05$

Table IV-15. Average Total Credits Earned (Dual Credit and AP) for Graduates (Pooled Sample), by Subgroup

Subgroup	Treat N	Comp N	Adjusted Treatment Mean	Unadjusted Comparison Mean	Impact Estimate	Effect Size (Hedges' *g*)	*p* Value
All Students (pooled)	6,341 (16 sch)	13,039 (32 sch)	4.67 credits (*SD*=9.68)	5.45 credits (*SD*=11.55)	-0.77 credits	-.07 *SD*	.369
Economically Disadvantaged (pooled)	3,560 (16 sch)	7,410 (32 sch)	2.47 credits (*SD*=7.55)	2.60 credits (*SD*=7.79)	-0.13 credits	-.01 *SD*	.841
Not Economically Disadvantaged (pooled)	2,781 (12 sch)	5,307 (19 sch)	9.00 credits (*SD*=11.51)	9.55 credits (*SD*=14.31)	-0.56 credits	-.05 *SD*	.734
Underrepresented Race/Ethnic (pooled)	2,915 (16 sch)	6,239 (32 sch)	2.08 credits (*SD*=7.74)	2.62 credits (*SD*=8.11)	-0.55 credits	-.06 *SD*	.529
Not Underrepresented Race/ Ethnic (pooled)	3,426 (16 sch)	6,785 (29 sch)	7.82 credits (*SD*=10.92)	8.07 credits (*SD*=13.48)	0.24 credits	-.02 *SD*	.823

No differences were statistically significant.

analysis allowed us to better understand what is occurring. To explore this outcome, we combined the data sets on college coursetaking and credits earned for the students in the pooled 2018–19 and 2019–20 graduation sample. This required us to use the course enrollment files for 2016–17 to 2019–20 to identify graduates who had *enrolled* in one or more CCP courses during the study period. These data were combined with the total dual credits earned from the graduation core file. These combined data allowed us to define four dichotomous indicators—one related to enrollment and three related to the total dual credits earned—described below.

- HS Graduates Enrolling in a CCP Course: Students were assigned a 1 if they had at least one CCP course enrollment record in 2016–17, 2017–18, or 2018–19, and 0 otherwise.
- HS Graduates Earning 3+ Dual Credits: Students were assigned a 1 if the sum of dual credits earned in the graduation core file was greater than or equal to 3, and 0 otherwise.
- Enrolled in a CCP Course, but no Dual Credit: Students were assigned a 1 if they had enrolled in a CCP course and the sum of dual credits earned in the graduation core file was 0, and 0 otherwise.
- Earned Some Dual Credit, Fewer than 3 Credits: Students were assigned a 1 if the sum of dual credits earned in the graduation core file was greater than 0 but less than 3, and 0 otherwise.

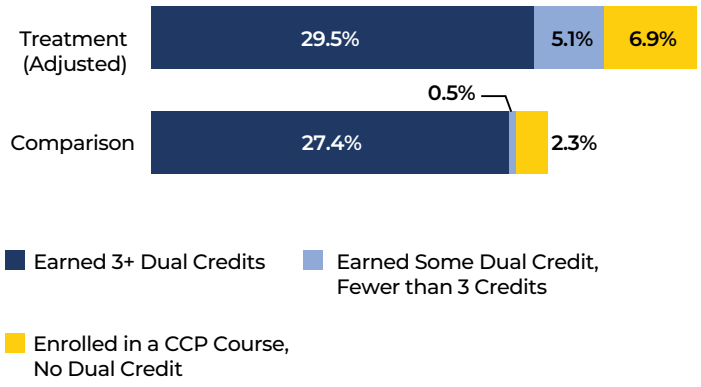
Note that if a student had enrolled in a CCP course, they were assigned a score of 1 for one of the mutually exclusive dual credit categories and a score of 0 for the others. Students who never enrolled in a CCP course were assigned scores of 0 for all indicators. Thus, the percentage of students enrolling in a CCP course equals the sum of the percentage of students in each of the three credit-earning categories.

We used these variables as outcomes in models using the same covariates as the other models (including baseline values for these covariates from 2015–16). These analyses showed that, in general, CCRE schools improved student

access to college-level coursework, including both CCP and AP courses, relative to comparison high schools. However, improved access did not lead to significant differences in the number of credits accrued or in the percentage of students earning three or more dual credits or scoring a 3 or higher on an AP exam to earn college credit equivalents.

Figure IV-1 (page 53) details additional outcomes for the 19,380 graduates (pooled for Years 3 and 4) who formed the analytic sample for Outcome 5. The figure illustrates the gaps in access versus credit earning outcomes. If we start by looking at the length of the two bars in the figure, we see that the treatment group had more high school graduates enrolling in dual-credit courses—an impact of 11.3 percentage points. Despite this positive impact on enrollment, we did not find a significant difference in the percentage of students earning three or more dual credits between the treatment and comparison schools. The different colored sections of the bars further explain what might be happening.

Figure IV-1. Enrollment in CCP Courses and Earning Credits for 2018–19 and 2019–20 Graduates



First, a significantly higher proportion of students in CCP schools enrolled in a CCP course but did not earn any dual credit; this is shown as the orange section of the bar graph as a 4.6 percentage point difference between treatment and comparison schools (6.9% vs. 2.3%). The data did not have details about why students did not receive credit, so we did not know if a greater percentage of treatment school students were failing courses, or were withdrawing from courses, or if another phenomenon was occurring. Second, a significantly higher proportion of students in CCRE schools earned greater than 0 but fewer than 3 dual credits—also a 4.6 percentage point difference between the groups (5.1% vs. 0.5%). This result was likely driven by greater enrollments in only one-credit or two-credit courses, such as COLS 1101 or BGMT 1008 at Columbus State, or similar courses at other institutions. Again, the data did not contain sufficient detail to discern what exactly was occurring—they did not include individual course names—but it appears that at the comparison schools, similar introductory courses were not being taken in large numbers without students also taking additional dual-credit courses.

Section V: Impacts on schools

The CCRE Key Components (described in Section II) supported implementation of the Early College Design Principles in the CCRE schools. The four Design Principles outlined in the grant proposal and logic model—a Career and College-Ready Academic Program, a College Headstart, Wraparound Student Supports, and School-Level Organizational Practices—describe characteristics of schools that are focused on career and college readiness.

This section utilizes data from surveys, interviews, and observations to present findings related to school-level implementation of the four Early College Design Principles. Each section describes the Design Principle and how it was implemented over the life of the project.

V.1. CAREER AND COLLEGE-READY ACADEMIC PROGRAM

CCRE worked toward a bold goal of having 90% of high school students earn some college credit. The Career and College-Ready Academic Program Design Principle was the one most directly aligned to this goal. As part of this Design Principle, schools were expected to create an academic program of study that gave almost all students the opportunity to be prepared for college and to attain college credit while still in high school. In addition, schools were expected to create aligned sequences of courses or pathways that led to 12 or more college credits and that incorporated opportunities for work-based learning. This Design Principle also focused on classroom practices and instructional strategies that enhanced rigor.

V.1.1. Coursework and Pathways

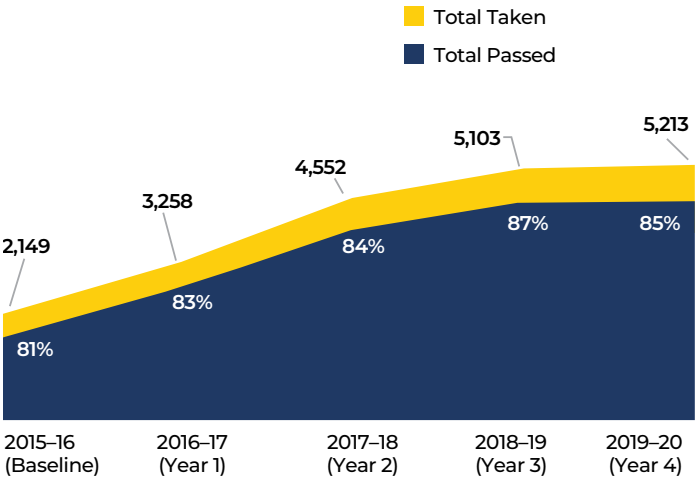
A critical part of the Career and College-Ready Academic Program was to expand access to college-level courses. As the results presented in Section IV show, the schools were successful in expanding access to college courses. This section describes in more depth what that looked like at the school level.

In the CCRE high schools, college-level courses were offered in one of four formats. First, students could take college courses on the Columbus State campus. Second, students could be taught on the high school campus by an adjunct faculty member, usually a high school teacher who met the qualifications set by Columbus State. Third, the college course could be a offered as a facilitated course. In the facilitated course setting, students were enrolled in a regular high school course (e.g., Chemistry) and would also participate in an online college course or receive additional instruction from a college instructor with the high school teacher acting as a facilitator. The fourth option was for students to take AP courses; to receive college credit, they also had to pass the exam associated with the course. These four formats allowed schools to provide college-coursetaking options in a way that best aligned with their needs and capacity.

By the last full year of the project (2019–20), 37% of graduates in CCRE schools had earned at least some college credits (either CCP or AP). Data from Columbus State show that the number of dual-enrollment courses taken by students in CCRE schools more than doubled from the baseline year, increasing from 2,149 in 2015–16 to 5,213 in Year 4. This expansion did not result in lower pass rates, which remained fairly steady, even increasing slightly over time. Figure V-1 (page 51) shows the trends in Columbus State coursetaking since before the project through Year 4; it includes both the number of courses taken as well as the pass rates for those courses.

A small proportion of this increase in coursetaking was due to increases in students taking two college readiness courses offered by many of the participating schools, COLS 1101 and BMGT 1008. The former was a one-credit college readiness course that was adapted from a course taught at Columbus State. The latter was a course that focused on 21st century workplace skills. At the baseline year, there were 112 of those courses taken, which increased to 667 in Year 4.

Figure V-1: Increases in Columbus State Dual-enrollment courses, 2015–2020



More information about the strategies Columbus State and the schools used to expand access to college coursetaking can be found in the accompanying policy brief, *Addressing Inequity: Expanding Access to College-Level Courses in High School.*

The program's expectation was not just that schools should get students to take college courses but that these courses would be structured as pathways that would lead students to a college major or a technical credential. By the end of the project, each school had submitted a design for at least one pathway, but they were in varying degrees of implementation. These pathways were created to address district and school needs. Some districts created pathways in line with the original CCRE focus on developing a sequence of high school and college courses that supported matriculation at Columbus State or another higher education institution. Other districts focused on building pathways with immediate CTE credentials. One district also conceptualized post-high school pathways in a broad sense, thinking about three different post-high school activities: postsecondary enrollment, employment, and enlistment in the military. Creating pathways was a heavy lift for many of the schools as they faced challenges in identifying areas of study that had both sufficient student interest and courses that could be taught by current faculty, and that could transition students to college courses or a career.

Many school staff noted that the expanded access to college courses was changing the culture of their schools and thereby increasing expectations for students. For example, when asked about the impact of the project, one teacher said,

A teacher in a different school agreed, noting,

> **[I see] more students taking the college courses, definitely. I mean, that's the biggest thing, and I think then that changes the mindset of teachers because ... it's very rewarding and encouraging when you see your young people in your school doing well in these college courses, when you see them graduating with college credit and going on to college. I think that is something that was not happening when I first came to [this school]. And I think it gives credence to what we're saying when we're saying, "Hey, we have to prepare them for college,"... Because years ago, [this high school] had a low graduation rate, and the students weren't going to college. And so, it's easy to say, "Oh well these kids aren't going to do that." But when you see students doing it, I think it changes the mindset and it makes people rise up a little bit more.**
>
> — Staff member in district

"It's shifted some of that mindset too, that focusing on, 'What can we do to get students college credit?' [It's] to the point now where we're offering AP courses at the freshman level."

V.2.2. Work-Based Learning

To increase the relevance of students' high school experiences and make a better connection to careers, CCRE schools were expected to provide work-based learning experiences in the school associated with the pathways. Columbus State staff conceptualized work-based learning as a continuum of activities that ranged from career awareness activities, to high school and college coursework aligned with career pathways, to meaningful work experiences, such as career assessments, job shadowing, and internships.

Table V.1. Work-Based Learning—Year 1 to Year 4

Work-based Learning	Year 1 Mean (n=15)	Year 4 Mean (n=15)
Overall Mean	2.38	2.56
Scale	1- Not offered; 2- Fewer than 25%; 3- 25% to 50%; 4- 51% to 75%; 5- Greater than 75%	

No differences were statistically significant.

In general, schools showed less change in their work-based learning activities than in other areas. The survey asked school administrators and counselors to indicate the percentage of students who participate in various work-based learning activities before they graduate. The results showed an increase in the implementation of work-based learning activities but with a non-significant difference between Year 1 and Year 4; the lack of significance may be driven by the very small sample size given that analysis of this scale was at the school level. Table V.1 shows the overall scale results.

The reported lack of a large positive impact on work-based learning was supported by the interviews, which suggested that the implementation of work-based learning activities was still in the beginning phases, even in Year 4 of the project. Interviewees reported activities related to career awareness, such as using the software package Naviance, hosting career days, or inviting local employers in as guest speakers. Teachers in one district reported integrating soft skills and work-based content into their instructional practices. A student in that district described how her business pathway had given her exposure to real-world experiences:

> **"So, my junior year, we learned how to start a business up and maintain our business. And our business for the school is making t-shirts and making designs for everybody. And so, now our senior year, we're doing the Incubator, which is like, we make basically an invention. My product is a saving app to help kids save their money. So, if it goes big, after high school, we can have that as our job and sell that product."**
>
> — Student

Establishing more resource-intensive activities, such as internships or job-shadowing, was more challenging for schools. Most districts reported that they were in the early stages of trying to make connections with employers and setting up meaningful work-based learning opportunities. Two schools were trying to get internship experiences up and running, but they were not yet fully operational. A counselor in one district believed that the grant had not helped with work-based learning:

> **"I feel like that's a big deficit, and this grant has done great for the 5% of kids who are the top of the class and are ready to do their CCP and are college-bound, and they just got it. But we have 50% of the class who are going to be amazing workers, but we're not cultivating that; when you said, "work-based experience," our kids would love to do that … I think that a lot of our kids could benefit from a dual enrollment program, that really does that apprenticeship. So no, I haven't seen a change."**
>
> — Counselor

On the other hand, a teacher in another district acknowledged the grant had started out with the college-going focus, but had shifted to also include more about work-based learning:

> **"I think what we noticed was … when we first started doing the college readiness initiative, [we were] forgetting the fact that there were students that just realistically we're not going to be on that [college] path, and we didn't want them to feel isolated or left out. And so, I think that the way we're doing it now is a lot more inclusive."**
>
> — Teacher

V.1.3. Instructional Practices

The CCRE program focused on high school classroom instruction as a major contributor to student college and career readiness. As such, a shared vision for instruction was seen as an important part of a school-wide Career and College-Ready Academic Program. According to the survey results, 52% of Year 4 respondents indicated that there was a common vision driving major instructional decisions for all staff; this was a statistically significant increase over the Year 1 level of 36%. The survey results were supported by interviews. Participants in three of the site visit schools commented that they were using a common framework to support instructional improvement. As an administrator in one of the schools said, "I would say common language was huge—everyone having the same common language when you're talking about instruction."

The original intent was that all schools implement the Common Instruction Framework (or CIF), a set of six instructional practices articulated by JFF. Table V-2 (page 54) shows the CIF strategies and how they were measured through the school implementation survey. As seen in the table, the survey measured no significant changes in school-wide presence of the CIF strategies between Year 1 and Year 4.

Interviews suggested that the lack of significant changes across the board was likely because the emphasis on instructional practices differed by district. One district had an extremely strong emphasis on instructional change, with the CIF serving as one of the organizing structures for district-wide school improvement. In this district, all staff received formal professional development in the CIF strategies, and department chairs were expected to ensure that teachers in their departments were implementing the CIF strategies as well as model the instructional practices in their own meetings. According to an administrator, the CIF strategies became embedded in the culture of the school and the district by the end of the project:

> **"We're now into the fourth year that I think it is part of the culture. It's part of our framework for learning. All staff are aware, and … I don't think there's the pushback on it at all. It is just an accepted way … particularly for the instructional piece, that is how we teach. It's wrapped up into every building's professional development plans, staff retreats, our new teacher orientation programs, and even like, your one [to] three teachers whom are relatively new to the district undergo training."**
>
> —Administrator

The staff in this district believed that implementation of the CIF had a positive impact on students. For example, one teacher said, "[Student learning] has definitely increased because they're more responsible for their own learning; they have to figure it out."

Table V-2. Use of CIF Practices—Year 1 to Year 4

Indicator	Year 1 Mean (n≥760)	Year 4 Mean (n≥561)	Sample Question *This year how frequently have you...*
Classroom Talk (5 items)	3.78	3.83	Asked students to engage in in-depth discussions about what they have read or learned?
Collaborative Group Work (3 items)	3.60	3.57	Defined clear roles and expectations for students working in groups?
Literacy Groups (2 items)	3.28	3.29	Had students read content-based texts in groups?
Questioning (3 items)	3.71	3.74	Used student-developed questions to guide discussions?
Scaffolding (4 items)	3.95	4.01	Made connections between material covered previously and new content?
Writing to Learn (3 items)	3.60	3.69	Used low-stakes writing (e.g., journaling, free writing, open-response exit tickets) as a means of formative assessment?
Overall Mean	3.70	3.74	
Scale	Scale: 1 = Never; 2 = A few times this year; 3 = Once or twice a month; 4 = Once or twice a week; 5 = Almost every day		

None of the differences were statistically significant.

The remaining districts reported incorporating varying levels of the CIF, usually integrating it into other instructional initiatives. One district had developed its own instructional framework with an accompanying lesson plan structure. The staff in this district noted that they were encouraged to use the CIF strategies but that it was not required in any way. In two of the districts, the CIF work was being supplemented with "Teacher Clarity," an intervention that helped teachers focus on the specific content that students were expected to learn. In another school, teachers discussed implementing the "Writing to Learn" CIF instructional practice along with an effort to do a writing methodology called "I.C.E." (Introduce, Cite, and Explain). A different school had an emphasis on differentiation, which integrated some of the CIF strategies.

The emphasis, or lack thereof, on CIF was driven by the amount of attention paid to the practices by school and district leadership. In districts with high implementation, there were clear instructional expectations and structures put in place to support their implementation. In districts with perceived lower implementation, leadership may have emphasized other instructional approaches or may have relied on individual teacher groups to identify instructional practices they wanted to implement.

School staff turnover was also seen as having a negative impact on implementation of instructional change. In two schools, all instructional emphases were on hold in the final year as a result of changes in principals. In a third school, a teacher noted that, even though there had been training on

the CIF instructional strategies at the beginning of the grant, they were not really bringing new teachers up to speed: "I don't see a sustained training effort. There tends to be a, "Oh, we've already trained on that," but we didn't have all that much training last year when we had some new teachers, and we haven't had any this year, and we have some new teachers."

V.1.4. Strong Postsecondary Partnership

A strong postsecondary partnership was a critical part of ensuring that a Career and College- Ready Academic Program was in place. Each district's primary partnership in this grant was with Columbus State, although some districts also had partnerships with other postsecondary institutions.

The school survey included questions that asked school staff to comment on specific aspects of their school's partnership with Columbus State. As not all staff members in the project schools had awareness of the partnership with Columbus State, survey respondents could reply "Don't know" to any of the items within this section of the survey. As shown in Table V-3, there was a statistically significant increase in reported implementation of most aspects of the partnership from Year 1 to Year 4.

Interviews with school and district staff suggested that the Columbus State partnership was perceived as strong overall by the end of the project. One district coordinator commented, "They're truly there to help us 24/7." Another

Table V-3. Postsecondary Partnership with Columbus State—Year 1 to Year 4

Indicator	Year 1 Mean (n≥458)	Year 4 Mean (n≥450)	Year 4 Percent Agree / Strongly Agree	Proportion of Don't Know & No Response
Our students have access to college resources and facilities at CSCC.	4.53	4.79*	66%	24.7% (n= 167)
We have a strong partnership between our school and Columbus State Community College (CSCC).	4.34	4.54	57%	22.7% (n= 153)
CSCC is supportive of our school and its vision.	4.25	4.47	54%	33.3% (n= 225)
Our school has a system to provide support to high school students taking college courses.	4.26	4.45	55%	19.9% (n= 134)
My school and CSCC collaborate to provide support to students in college courses.	4.04	4.36*	54%	31.3% (n= 211)
My school and CSCC collaborate to provide support to students to graduate from high school.	3.93	4.31*	52%	33.3% (n= 225)
I am aware of supports that CSCC provides to high school students taking college courses.	3.77	4.13*	47%	26.7% (n= 180)
Our school is aware of activities and events at CSCC.	3.48	3.82*	36%	28.7% (n= 194)
Overall Mean	4.08	4.38*		
Scale	1 = Strongly disagree; 2 = Disagree; 3 = Somewhat disagree; 4 = Somewhat agree;5 = Agree; 6 = Strongly Agree; Dk = Don't Know			

*Statistically significant difference between Year 1 and Year 4, $p<.05$.

coordinator said, "I think they do a phenomenal job of supporting us at the school level. I cannot tell you the number of times I've met or called [the dual enrollment coordinator], hundreds of times." A third noted,

> **"[The partnership is as] strong as it's always been. I think it hasn't diminished. As a matter of fact, we're currently working with [CSCC] on several programming opportunities. And I will say, whenever there's a phone call, we get a phone call back. Whenever there's a request from us to meet with them, we'll get a meeting."**
>
> —Coordinator

A principal in another district acknowledged the support that Columbus State had given them with their pathways:

> **"The intentionality with that partnership has helped us quite a bit in establishing pathways here at this school to provide more opportunities for our kiddos … That partnership is very, very important to us as [it is] our strongest partnership. … So, we need to lean on them."**
>
> —Principal

School staff did also recognize a few challenges with the partnership. One principal noted struggles with getting teachers credentialed to teach college courses. A coordinator in another district described how there were often challenges with scheduling courses.

V.2. CAREER AND COLLEGE HEADSTART

The second Early College Design Principle, Career and College Headstart, focused on ensuring that students were prepared for college courses and were provided with early exposure to the culture and norms of college as well as to careers.

A core part of readiness involved preparing students academically for the dual-enrollment courses that they would encounter. The instructional strategies and the COLS 1101 course described in Section II were two approaches to this. Many of the schools also used CCRE funds to purchase math and reading software to assess students' performance and provide accompanying differentiated instruction. Achieve3000 was the most commonly used literacy software and ALEKS was the most common math software. One school assessed student performance using the ACCUPLACER college placement exam for reading and writing and the ALEKS software for math. Based on students' scores, if needed, students would be enrolled in a technical writing course and/or a developmental math course that was intended to improve their scores and help them avoid the need for remediation in college.

In addition to academic content, the schools also increased their focus on college readiness behaviors, otherwise known as the "soft skills" needed for success in the postsecondary environment. Survey results showed that there was an increase in the extent to which teachers incorporated these skills in their instruction (Table V-4 page 57). By the end of the project, teachers reported statistically significantly higher levels of instruction in time management and self-advocacy.

Interviews provided more detail about how schools incorporated college readiness skills. In three of the six schools we visited, this was done during structured advising. During advising periods, ninth and tenth grade students

Table V-4. Frequency of College Skills Instruction—Year 1 to Year 4

College Readiness Skill	Teacher Mean	
	Year 1 (n≥650)	Year 4 (n≥533)
Time Management	3.36	3.58*
Note Taking	3.23	3.35
Organizational Skills	3.58	3.68
Advocating for themselves with high school and college faculty	3.17	3.53*
Overall Mean	3.34	3.54*
Scale	1- Never; 2- A few times this year; 3- Once or twice a month; 4- Once or twice a week; 5- Almost every day	

*Statistically significant difference between Year 1 and Year 4, p<.05.

would work on interest and career exploration. In eleventh and twelfth grades, the focus was on student supports related to College Headstart, including college exploration and then college applications. In one of these schools, the counselors worked together to develop a curriculum to provide instruction in soft skills during an advisory period. A counselor explained: "We plan it out throughout the year, each month has a different theme [communication, collaboration, timelines]. So, if we want to talk about timeliness, or things of that nature, we would form a lesson for each week for each of the grades to go over those things. [Counseling staff] definitely meet up every month to discuss those things that we want to teach the students."

Schools also implemented activities intended to expose students to colleges and careers. This included opportunities such as college visits or college or career fairs. One school hosted "Future Fridays," during which business representatives would come to classes to talk with students about job opportunities, the training that would be required, and the benefits that would be offered. Many of the schools used Naviance, a career guidance software, to help students develop more of a future orientation, lay out their goals, and develop a plan for meeting those goals. As a school staff member said,

> **"Definitely throughout the time that I've been here I've just learned that exposure matters with the students. Exposure with Future Fridays and careers, exposure with college visits, and college fairs, and just all-around college programs that we have here. Exposure matters, because it does let them know that they can attain it, so it definitely helps that they are seeing these things on a daily and monthly basis. So that's one of the biggest things that I've learned."**
>
> —Staff

More information about how these schools created a future orientation can be found in the accompanying policy brief, *Developing a Future Orientation: How CCRE Schools Focused on Preparing Students for Life After High School.*

V.3. WRAPAROUND STUDENT SUPPORTS

Activities for the Wraparound Student Supports Design Principle included offering comprehensive academic supports, social and emotional programming and support,

and assistance with college applications and financial aid. Supports took the form of developing and sustaining relationships with students, offering academic assistance outside of regular class time, and employing systems that identify student needs and suggest targeted interventions. Logistic supports, such as registering for placement tests and courses, navigating college procedures, and understanding how to make use of college resources, were also included in the Wraparound Student Supports Design Principle. In this section, we focus on supports provided to student taking college courses and the general supports provided at the high school.

V.3.1. Supports for College Courses

As schools expanded their college course offerings, they also needed to think about how to provide supports to students taking college courses. The fact that the project was being led by a community college meant that the supports could be more seamlessly coordinated between the school and the College than is often the case with dual enrollment partnerships. One of the key support strategies was the use of the College's Starfish early alert and monitoring system. This system used key indicators (e.g., attendance, assignment grades) to identify students who might need assistance in a course. Faculty entered data into the system and when students missed a pre-specified threshold, such as number of days absent or assignments missed, the system usually triggered an alert that was sent, via e-mail, to the student and the instructor. Faculty were also periodically sent a survey asking them to comment on students' progress in the course so those faculty who were not regularly using Starfish could also provide input on how their students are doing.

As of the third year of the project, all schools had identified an early alert contact, often a counselor, who also received notifications from the early alert system. A Columbus State staff person described how the system operated:

> **"[The schools] have an early alert contact that is supposed to monitor Starfish. They have access to it, to keep track of their students, in addition to our advisors monitoring it on our end as well. And so, our advisors, when they see there's a flag that has been raised, they email the student and cc the counselor [regarding] that specific concern. Among our expectations is that they do that within seven days of that flag being raised."**
>
> —Staff

Over the course of the project, high school teachers serving as adjunct or facilitating faculty became more and more accustomed to entering data into the Starfish system. According to the data from Columbus State, 96% of the college courses taught at the high school were using the early alert system in the spring of Year 4. Interviewees who used Starfish believed it could provide useful data to high school staff, as described by a counselor:

> **"I get an email and, if I log into Starfish, I can also view all of those alerts. For example, right now I got an alert from an English professor for a student that [had a] participation concern, attendance concern, class completion concern, and all for the same student. That student is basically hospitalized...So, knowing that she's struggling in the class and she might not be able to attend class for a while, I reached out to [the Columbus State advisor] today to see what her options were. So, if we have a medical note, we can drop the class without penalty of a W".**
>
> —Counselor

High school staff turnover did pose a continuity challenge for the use of Starfish, however. For example, in Year 4, one counselor noted that they no longer had access to the system because the previous early alert contact had resigned. Schools were expected to identify new contacts who Columbus State would then train.

In addition to Starfish, all students taking dual-enrollment courses were eligible to receive tutoring from Columbus State both on the college campus and through the online service, NetTutor. According to data from Columbus State, 186 students participated in college tutoring activities in the fall of 2019 (Year 4).

V.3.2. High School Supports

Over the course of the project, participating schools were expected to implement a variety of strategies to improve the academic and affective supports for students. As noted earlier, many schools utilized software to build students' English and math skills. Other key strategies that were a focus of the project included: starting new advisory periods or further refining existing advisories, implementing indicator and tiered support systems, bringing in additional counseling help, and providing explicit support around college logistics and financial aid. Survey results showed

Table V-5. Percentage of Schools Indicating Specific Levels of High School Students' Receipt of Academic and Social/Emotional Supports—Year 1 to Year 4

Academic and Social/Emotional Supports	Year 1 Mean (n=15)	Year 4 Mean (n=15)
Advising on courses to take to prepare for college	4.60	4.27
Advising on choosing college classes	3.80	3.73
College exam preparation (Test-taking skills for SAT, PSAT, ACT, ACCUPLACER, or other college placement exams)	3.40	4.27*
Registration for college exams (SAT, PSAT, ACT, ACCUPLACER, or other similar exams)	4.20	4.33
Assistance with applications for accessing College Credit Plus courses.	3.40	3.40
Advising parents about college admissions and financial aid	3.47	4.00
Helping students through the college admissions process	3.73	4.07
Helping students through the financial aid process	3.47	4.20*
Academic tutoring connected to a specific class	3.53	3.33
Small-group and individualized instruction	2.80	3.00
Sessions or classes to help students cope with social or emotional issues	2.33	2.93
Structures to build student-to-student relationships (e.g. peer connections, mentoring).	2.27	2.47
Overall Mean	3.42	3.67
Scale	1- Not offered; 2- Fewer than 25%; 3- 25% to 50% 4- 51% to 75%; 5- Greater than 75%	

*Statistically significant difference between Year 1 and Year 4, $p<.05$.

higher reported levels of support in Year 4 (compared to Year 1) in several areas, with statistically significant changes related to logistical support on financial aid and college exam preparation (see Table V-5 page 59). It is important to note that this analysis was conducted at the school level, so the sample size is small.

Some schools did implement substantial changes in their support systems, described below.

Advisory Periods. Three of the six visited schools had advisory periods, which were specific times set aside during the school day for school staff to check in with students, for students to get tutoring, and/or to provide students explicit instruction in college readiness skills, as mentioned earlier. For example, one school had a 45-minute advisory period that they restructured in Year 3 of the grant to be more focused on college and career readiness. Students in this school commented that they "definitely noticed a focus on college and career readiness. Especially with like [the advisory]. It's definitely helped." Students described that "in the [advisory], we plan everything, whether it's college, jobs, after high school, graduating, anything..." They said that college professors came to talk to them, and they got help with signing up for ACTs, writing college essays, time management, and knowing college expectations.

Indicator and Tiered Support Systems. One of the goals of the project was to implement systems that would help identify students who are ready for college and careers and enable schools to intervene if needed. All of the districts had some sort of data system to identify students who were struggling, but, by the end of the grant, only one of those systems had incorporated career and college readiness indicators (see box).

Even though only one of the schools had implemented a formal system with the college readiness indicators, all of the site visit schools reported an increased emphasis on applying data from their systems through Multi-Tiered Systems of Support or Response to Intervention.

College Readiness Early Alert in South-Western

Prior to the CCRE project, South-Western's early alert system involving synthesizing data from five or six different data sources into an Excel spreadsheet. Then, according to a district staff member, "We'd have to do all the voodoo that it required to kind of make sense of it."

About two years in to the project, they improved their system by using Tableau to integrate the data and create a series of dashboards that would allow the district to identify students who were at risk or who needed acceleration. With the impetus of the CCRE project, South-Western also incorporated college and career readiness indicators, taken from research by David Conley and the Bill & Melinda Gates Foundation. According to district staff, "The dashboards are broken down by grade level seven through 12, and they each have different components, some overlapping ... of college career readiness indicators." The dashboards can help school staff look at a variety of indicators, such as students who might be earning A's and B's in AP courses but only getting a 1 or 2 on the exam.

The district has provided training to building leadership teams on how to look at and use the data.

Additional Counseling Capacity. Schools recognized that the CCRE project required support beyond what their normal counseling staff could provide. As a result, most of the schools in the project expanded their counseling capacity by working with partner organizations, such as I Know I Can (IKIC) and

Communities in Schools (CIS). In some cases, the districts used grant funds to support these services and, in other cases, they were able to leverage other funding sources. The focus of IKIC counselors, in particular, was closely related to the CCRE goals of improving college and career readiness. These counselors worked with students one-on-one to advise, provide college application support, schedule college visits, and administer college placement tests. They used a curriculum that emphasized exploration for freshmen and sophomores, career and college opportunities for juniors, and helping seniors apply to colleges. One IKIC counselor described typical interactions with students:

> **"The majority of our time is spent doing one-on-one interactions with students. So, either they'll come down here and just pop in and say, "Hey, I need help with this." I also try to pull about 10 students a day to meet with and it depends on what I'm kind of looking for that day for students, maybe it's just seniors I have not met with at all yet, and maybe it's around a certain college—you're all interested in Otterbein, let's sit down together as a group and talk about what that means. We organize the rep visits for colleges to come in and talk to students. We try to sit in on some of those, but then we do some group work. So, a couple weeks ago, and then next [again] week, we're going to do the second round, but I'll go in with our senior counselor to do those."**
>
> —Counselor

In some schools, these IKIC counselors were responsible for guiding much of the college readiness work. Over the course of our site visits, we observed increasing coordination between school counselors and IKIC counselors in several schools. In these schools, IKIC offices were situated close to the guidance counselor offices and fully integrated into the daily activities of the building. School counselors and IKIC counselors both reported working seamlessly with each other in these schools.

CIS counselors were also in several CCRE schools and provided a broader range of supports to a more targeted population, using a three-tier system to facilitate student success. Many students received only Tier I support which consisted of "light touches" to monitor those who might need consistent but minimal guidance to continue to be successful. In many cases, this regular contact was handled by teachers. For students who needed Tier II support, CIS counselors provided small group interventions; Tier III was more of a hands-on approach, with students having daily contact with the CIS counselor, who would help monitor progress and recognize their successes. We observed students visiting their school's CIS office to touch base, grab a snack, or share a success story.

Support for College Application and Financial Aid Logistics. On the survey, the two support indicators that showed statistically significant improvement were preparation for the ACT/SAT exams and helping students through the financial aid process. Helping students through the college application process also improved although the change over time was not statistically significant. Much of this support was probably being provided by the IKIC counselors. For example, schools hosted FAFSA nights, often one or more evenings where volunteers (usually school and IKIC counselors) were available to help parents fill out the FAFSA form for their students.

V.4. SCHOOL-LEVEL ORGANIZATIONAL PRACTICES

The final Early College Design Principle encompassed school-level practices that need to be in place to ensure effective implementation of the other Design Principles. As shown in the logic model (Figure I-1), these practices included: 1) structures to support personalized relationships, 2) establishment of a college-going culture, 3) ongoing job-

embedded PD, 4) data-based decision-making, and 5) time and support for teacher collaboration. We collected data concerning implementation of these different organizational practices through the implementation survey and interviews. Before discussing the components explicitly mentioned in the conceptualization of Design Principles, we begin with a brief discussion of school leadership. We also present a summary of the survey results for relevant scales; these results and additional detail on some scales are included in the discussion below.

Table V-6. School Organizational Practices—Year 1 to Year 4

Scale	Year 1 Mean	Year 4 Mean
Leadership	4.61	4.65
Structures to Support Personalized Relationships	4.28	4.38
College-going Culture	4.11	4.21
Use of High School Data	3.51	3.53
Use of College Data	1.87	2.06*
Collaborative Planning	3.64	4.15
Job-embedded Professional Development	2.36	2.36

*Statistically significant difference between Year 1 and Year 4, $p<.05$.

V.4.1. School Leadership

Research conducted by SERVE Center on other reform efforts has indicated that effective leadership is a key support for school-level implementation. Because of the critical role of school leaders, a Key Component in the CCRE model was leadership coaching and technical assistance, which was designed to improve the practices of leadership teams in participating schools. Given this emphasis, the evaluation captured perceptions of the quality of school leadership through the staff survey and in interviews. The survey measured no changes in perceived implementation of leadership skills over time, which was not surprising given that there was leadership turnover in many of the schools and districts over the life of the project.

Interviewed staff reinforced the idea that leadership, at both the school and district level, was critical to the success of the project. In reflecting on lessons learned from the grant, a district staff member noted, "First and foremost, broad sweeping shifts can only be done successfully if you have commitment from decision makers in the district, those that have influence and those that have the positional authority to make decisions and be a part of it."

Although district support was seen as important, the principal was also seen as playing a critical role in implementation. In a different district, a staff person noted the importance of a principal:

> **"We have a purpose and that purpose is making sure that we're doing everything we can for enrollment, enlistment, and employment. And so, having the principal completely devoted to it, committed to it, that's been the big change... when we had somebody in leadership in place that was not just following the design but believed in it and communicated it clearly."**
>
> —Staff

A key role for the principal was communicating the importance of the project. As one teacher noted, "I really think that the principal's role ... is to set the message. I mean, he's not in charge of the mechanics of the program, but to make sure that we keep that at the forefront of what we're thinking about, that that's where we're all going." Additionally, the principal could lead the work by coordinating professional development or by providing other resources.

Leadership did not only reside with the principal. Staff in three of the schools described Building Leadership Teams, in which teachers (usually the department chairs) worked with the administration to assist in rolling out initiatives. Additionally, as described earlier under instructional practices, the department chairs were sometimes given the responsibility of ensuring that instructional changes were being implemented.

Turnover among both school and district leadership was generally seen as slowing down implementation. For example, a Columbus State staff member noted that principals in one district had been struggling with implementation because of district leadership turnover: "I think they've been stymied over the last year and a half because of changes and transition in superintendents." Staff in another district noted how priorities had shifted with a change in school leadership, and staff in a third district noted that a new principal could put implementation of project-related activities on a hiatus.

V.4.2. Structures to Support Personalized Relationships

School-Wide Organizational Practices also included structures or actions to support personalized relationships in which staff knew students and their families well, demonstrated a belief that all students can succeed, showed respect for and received respect from students, and provided mentoring and advising to students. The survey showed no statistically significant changes on specific questions that asked about personalized relationships.

As seen in the site visits, most schools did have structures that were designed to provide supports for students (e.g., MTSS or RTI), which have been described in the sections on early alert systems and student supports. The advisory periods, implemented by schools in two districts, were specifically designed to allow time for teachers to work in small groups with students and get to know them better. Staff in both of those districts noted that they were trying to improve their data tracking in each of those advisories. For example, one school introduced digital portfolios for students, which allowed for staff to provide more personalized supports.

Schools also reported reaching out to parents through evening activities such as college application nights or FAFSA nights, but the staff frequently reported low attendance at most of these functions.

V.4.3. College-Going Culture

In addition to structures to support relationships, the Design Principle of School-Wide Organizational Practices focused on the establishment of a college-going culture. Evidence of a college-going culture included: 1) the demonstration of high expectations for students, 2) student beliefs that they could succeed in a college environment, and 3) a school-wide focus on the academic and social skills necessary for success in college. School staff members responded to a set of survey items dealing with beliefs, expectations, and supports for students to attend college. Table V-7 (page 64) shows the differences across the four years trended upwards, but that none of the differences were statistically significant. The lack of a statistically significant impact was interesting given that the other scales that showed positive impacts were related to college partnerships, college readiness skills, and college-related supports.

The site visit data indicated that all schools were engaged in activities designed to support a college-going culture such as student visits to colleges, college representative visits to high schools, and evening informational sessions about college applications or the FAFSA.

Many of the schools noted that there was not a strong emphasis on college in their community or that many of their students may not end up attending college at all. As a result, they believed that there needed to be a culture that promoted multiple options for students after high school, not just college-going. As a teacher in one district said,

"I guess one thing is a focus on career as well. We have 60% of students on free or reduced-price lunch. As a district, as a building, we have to look at it. There are some kids where college may not be an option for them outside of the walls of CCP. We know that some students, if they have even some college, they have more career potential than none. If they know they can succeed, then all of a sudden, they might work and find resources themselves as young adults. There is more of the trying; how do we make them actually career-ready too?"

—Teacher

"Not only are we focusing on the enrolled piece with the college credit … but we're also looking at other things that we can do, especially with the employee piece. How can we get our students credentialed? What opportunities can we offer here at the high school for those students that we know aren't going to go that traditional college route, that may need their certificate or the trade? And then obviously the enlistment piece, when we talk about, what are the opportunities, bringing in more recruiters …. So, I think originally, it started with that push for the college credit. "

—Staff

A different district was focused on making sure each student was thinking about the "Three E's" or what they were going to do to make sure they were "Enrolled, Employed, or Enlisted" after high school. As a staff member noted,

Across all visited schools, however, there was a sense that the schools were focused on making sure that students were planning for life after high school.

Table V-7. College-Going Culture—Year 1 to Year 4

Statement	Year 1 Mean (n≥747)	Year 4 Mean (n≥621)	Year 4 Percent Agree / Strongly Agree
The faculty and staff in this school expect every student to have the opportunity to receive postsecondary education or training.	4.35	4.47	56%
All faculty and staff in this school believe that, if given enough support, all students can successfully complete college preparatory courses.	3.94	3.99	39%
The faculty and staff at the school explicitly and purposefully focus on postsecondary aspirations.	4.07	4.22	45%
The faculty and staff at the school focus on specific activities that lead to enrollment in a postsecondary institution.	4.11	4.31	46%
The vision of this school is tied to preparing every student for postsecondary education without remediation.	4.11	4.12	43%
The school provides activities designed to get all students to think of themselves as students who can succeed in a postsecondary institution.	4.07	4.16	42%
Overall Mean	4.11	4.21	
Scale	1 = Strongly disagree; 2 = Disagree; 3 = Somewhat disagree; 4 = Somewhat agree; 5 = Agree; 6 = Strongly Agree		

V.4.4. Ongoing, Job-Embedded Professional Development

Organizational practices also included supports for teachers such as ongoing, job-embedded professional development to help in implementing the Design Principles. Reponses to the survey showed no changes in the frequency of different professional development activities. At the school level, job-embedded professional development primarily took place through teacher collaborative structures (e.g., Teacher-based Teams, which are described in more depth in the section on teacher collaboration). At least three schools reported additional learning teams that often focused on specific content areas, which are also described in more depth below.

One school provided intensive ongoing school-based PD on the CIF strategies. The principal reported emphasizing the CIF in every half-day PD they had as well as at staff retreats, noting, "the structure of the PD being consistently based around that one [CIF] topic of instruction." One teacher commented that the in-house PD was better than external PD they had received, saying, "I feel like what we've gotten within the school, within the district, has been better than from the outside."

V.4.5. Data-Based Decision-Making

The School-Level Organizational Practices Design Principle also emphasized data-based decision-making in which staff members collected and used data about student progress to inform discussions about how to reach the goal of students being college-ready. On the survey, we asked about the use of both high school data and data from college courses. The survey showed a statistically significant increase in the use of data to improve students' outcomes in both high school and college courses (Table V-8).

Table V-8. Collective Use of High School and College Student Data—Year 1 to Year 4

Item	Year 1 Mean (n≥722)	Year 4 Mean (n≥613)	Never	A few times this year	Once or twice a month	Once or twice a week
High school staff used data on student performance in high school classes to improve curriculum and instruction.	2.37	2.49*	21%	27%	34%	18%
Our school collected or received data on student performance in college classes.	1.76	2.01*	36%	36%	20%	9%
High school staff used data on student performance in college classes to improve curriculum and instruction.	1.69	1.88*	46%	27%	19%	8%
High school staff used data on student performance in college classes to modify supports for students.	1.65	1.87*	46%	27%	20%	7%
Overall Mean	1.87	2.06*				

*Statistically significant difference between Year 1 and Year 4, $p<.05$.

In the interviews, all schools reported using data regularly at their schools. A project staff member believed that schools were having more data-focused discussions than ever before as a result of the project:

> **"They're having more of those conversations than they have ever had, across the board. … Again, we're moving into now, instead of, "Okay, what do we want to do as a building? What do we want to do overall for our classroom?" this is like, "What are we doing for each kid? And how are we helping the kids understand what is necessary for them to be able to matriculate forward with regard to the 90% goal?"**
>
> —Staff

A principal agreed with this assessment, noting, "This year, [data use is] hyper-focused. It's more being intentional about what we're doing in our teams, what data we're looking at, and how we're sharing it. But, I'm very confident that the [CCRE program] is the origin of that."

A lot of the data use came from districts' efforts to build their RTI or MTSS systems (described in more depth under student supports). One district, South-Western, established a well-functioning data system that allowed them to track student performance on a myriad of indicators. As an administrator said, "This is real time, which is nice. So, if I go in, I can go, my data center, data visualization Tableau, I have attendance dashboards, I have college career readiness dashboards." At least two other districts have worked with South-Western to adapt similar approaches to data use in their district.

Districts that were using ALEKS or Achieve3000, which were often funded as part of the grant, also noted how those programs were providing them with useful data to improve student performance. An administrator described how those data were used in the school:

> **ALEKS and Achieve [3000] really serve as our screeners and our progress monitoring tools. … They use that data to screen students, to monitor the progress, and then make decisions about how to intervene with students. But also, those programs, especially ALEKS … they use that as a tool to continue the learning for their students. And, so, they use that data to inform that instruction.**
>
> —Administrator

In schools with IKIC or CIS counselors, data were also an important part of their work. The counselors described how they collected and tracked data on key metrics (e.g., the percentage of students filling out the FAFSA, the percentage of students taking college entrance exams).

V.4.6. Time and Support for Teacher Collaboration

Time and support for teacher collaboration served as the final component of School-Level Organizational Practices. Because the implementation of an early college model was a collective, school-wide effort, the opportunity for teachers to collaborate served as an important supportive structure. We collected data through the survey on whether teachers were given more time to collaborate and how frequently they collaborated around certain topics. The survey results showed administrators reporting a substantial increase in time set aside for teacher collaboration although there was not a significant increase in teachers' reported collaboration on specific topics.

The interviews indicated that all school districts had some structures to support teacher collaboration. One school had a period called "Morning WoW" (Working on the Work) time, which was the 45 minutes before students arrived each day.

This time was allocated for group staff meetings once a week; two days a week were for common planning in their teams, and two days a week were for "focus groups" that allowed teachers to concentrate on specific topics such as RTI or the CIF strategies.

Instructional rounds, or peer observations, were frequently used in one school, whereby the school provided substitute teachers so that teachers could visit each other and observe teaching practices. A teacher described how they operated:

> **"Our class visits are focused on CIF. Teachers can, in the beginning say, "Hey, I'm going to try something out. I want you to give me your feedback on it, or I feel like I'm really doing a good job with this particular strategy. I'd like you to look for that and give feedback there. Teachers were identifying, before we went in their classrooms, the level of comfort, what specifically they were trying. That was just our focus. Then our focus shifted toward students. They started to use the SER, [the] Student Engagement Rubric … [which] focuses on students' behaviors and what students are able to do. We were looking for evidence of students growing and being farther along and different."**
>
> —Teacher

Interviewees in two other schools also mentioned peer observations. One indicated that they were working well but stopped happening when the principal who initiated them left. In the second school, staff noted that there were some walk-throughs that were done, but they were not systematically implemented.

In addition to adding some opportunities for collaboration, the grant was seen by staff in two schools as improving the quality of collaboration and giving more focus to the work. In one district, the staff noted that the grant has helped them be more intentional in how the different departments in the school interact with each other. In another school, the principal said, "The push to have a common language, and the TBTs, and to make those more effective … because of [the CCRE project] we were able to really have the department leads have a clear purpose."

V.5. SUMMARIZING SCHOOL IMPLEMENTATION

As described in this section, the changes that were made most broadly across schools were primarily associated with college readiness and the expansion of college courses. Schools reported increased partnership with Columbus State. More students were taking college-level courses and schools were expanding supports for these courses, including the use of the Starfish Early Alert system and the use of student data. Teachers reported increased incorporation of college readiness skills into their instruction and staff reported having more opportunities for students to prepare for the ACT/SAT and more support around financial aid. All of these are consistent with creating an environment more focused on college.

In areas that had a less direct connection to college coursetaking, school-based changes varied by school and district. For example, one district adopted the CIF and made district-wide instructional changes. This district also incorporated college readiness indicators into their data system so that they could identify students who were not on track for college or career. Some schools expanded their high school supports by establishing or refining advisory periods or by bringing on extra counseling staff from external organizations like I Know I Can or Communities in Schools.

According to interviews, the variation in implementation came down, as is the case with many initiatives, to the extent to which the district and school leadership believed the CCRE activities were important.

Section VI: Conclusions, Lessons Learned and Recommendations

The CCRE project was a complex, multi-year initiative that used college coursetaking as a lever to move schools to develop a culture focused on preparing students not just for high school graduation but for what came afterwards—what we called a "future orientation."

Throughout the grant period, the CCRE partners provided a range of implementation supports. They helped schools implement college courses and create pathways. They provided professional development and coaching to help schools change their instruction and improve their early alert systems and multi-tiered systems of support. They funded efforts to promote college readiness for students through a college success course and college readiness software. These supports were not always implemented at the level that was intended, but this was not because the support for them was not provided; it was because not all schools or districts availed themselves of these supports.

The project activities were intended to support schools as they implemented Early College Design Principles. The evaluation data showed that all schools were shifting their focus away from just preparing students for high school graduation, to preparing them for the next stage of life, whether that be college, a career, or the military.

The survey and administrative data highlighted changes that had been made across all schools. These changes tended to be related to college enrollment and success activities. Schools showed significant increases in the existence of a common vision of instruction. There were more supports focused on post-high school readiness and there was increased use of data from college courses.

Implementation tended to vary across districts. In some districts, the changes were primarily related to college coursetaking. One district, however, used the project as an impetus to redesign their entire district improvement plan to focus on student-centered instruction and college readiness.

The analyses of student impacts showed that the support activities and changes made by districts did lead to improvements in student outcomes. There was a statistically significant positive impact on the percentage of students who were on-track for high school graduation in ninth and tenth grade. There was also a statistically significant increase in the percentage of students who were taking college courses, although there was not a positive impact on credits earned.

The information in this report summarizes key implementation and impact findings. From these results and from other extensive data we have collected over the past five years we have identified several lessons and corresponding recommendations for practitioners and policymakers seeking to do similar work.

VI.1. THIS WORK REQUIRES STRONG PARTNERSHIPS

The early college model depends heavily on a high-quality partnership between school districts and colleges. The CCRE project was unique with the work being led by a community college, instead of a district or an external organization.

School, district, and college staff all believed that the partnership between Columbus State and the districts improved over the course of the grant. This stronger partnership allowed the organizations to work through many issues that often plague efforts to implement early college courses. For example, all districts were able to utilize the Starfish Early Alert system to track students' performance in college classes. One district worked through its FERPA restrictions to allow college instructors to share performance data with other adults in the high school. Another school set up its system so students could register for courses through their regular high school course management system. These kinds of issues only get resolved when a postsecondary institution comes to the table willing to listen to the high schools and consider how the college might operate differently.

We found definite advantages to having the work led by a community college. The College could support the streamlining of college policies, make sure that schools had access to student data and academic supports, and provide support to college and high school adjunct faculty teaching college courses. JFF has published a brief, Forging Regional Connections: The Role of a Community College in High School Transformation, that discusses how a college can lead this type of partnership.

Part of the partnership involved customizing the work. The CCRE project was not a one-size-fits-all approach and Columbus State worked hard to customize the supports they provided to the schools. For example, some districts received leadership coaching for their principals while other schools preferred to use the resources available for different professional development opportunities. The challenge with customization is making sure that the core of the intervention is not affected. We have published a brief that explores the partnership in more detail, focusing particularly on the benefits of flexibility and customization, *Key to Success: Relationship and Adaptability, Lessons Learned about Secondary/Postsecondary Partnerships from the College and Career Readiness Expansion Project.*

VI.2. THERE IS NO SUCH THING AS OVER-COMMUNICATION

With CCRE, as with other projects we have evaluated, participants had concerns with and questions about communication at multiple levels. We collected extensive data about project awareness, which showed that many teachers were unclear about the goals of the project. In interviews, staff commented on the desire to know more about what they were doing and why they were doing it.

An additional layer is communication with students. In some schools, students reported that they knew about the college course opportunities because the information was regularly shared at assemblies and other schoolwide events. Other students reported hearing very little to nothing about dual credit or other college- or career-readiness opportunities.

VI.3. EXPANDING ACCESS TO COLLEGE COURSES REQUIRES PAYING ATTENTION TO COLLEGE READINESS

CCRE managed to successfully expand access to students who are traditionally underrepresented in dual-enrollment courses. Expanding access can be done by making sure that eligible students are recruited and encouraged to participate. However, truly expanding access also means expanding the pool of students who are eligible to take college courses, which means making sure that more students are academically ready for college courses.

The project schools addressed the issue of readiness in several different ways. One district focused heavily on improving the quality of instruction to help more students be successful in college preparatory courses. Other districts used computer software to build students' reading and math skills. Teachers reported integrating more explicit instruction on skills such as time management. Our brief on expanding access describes some of these activities in more depth.

VI.4. SCHOOLS AND COLLEGES SHOULD THINK THROUGH HOW TO SUPPORT STUDENTS TAKING COLLEGE COURSES

Part of expanding access to college courses to more students also requires thinking about how to support students taking those courses. The CCRE project experimented with different approaches to supporting students. One of the more successful strategies was to give high school staff access to the college's Starfish system, which identifies students who might be struggling in class. High school staff received alerts and were able to identify and assist struggling students. Columbus State also gave dual enrollment students access to its online tutoring program, although it was accessed by only a relatively small proportion of students.

One of the areas where the project struggled was identifying an appropriate and sustainable level of advising support from the college. Schools often wanted a person there full- or half-time, but the college could not sustain that level of

funding commitment. This might be an area where partners could explore the possibility of jointly funding such positions as our previous work has highlighted the importance of college liaisons.

VI.5. EQUITY REQUIRES INTENTIONALITY AND PURPOSEFULNESS

Recent research has highlighted the equity challenges present in the current expansion of dual enrollment. CCRE has gone against the trend by focusing on expanding college coursetaking to students who are traditionally underrepresented in college. The work of this project, plus the data coming out of early colleges, suggest that disparities in access are not inevitable and that an intentional focus on equity can ensure that all populations of students can participate.

Part of this focus on equity means ensuring that students are ready for college courses and that they are supported in college courses, as noted in the sections above. As with expanding access, being intentional and purposeful about issues of equity in these supports will also go a long way.

VI.6. CREATING A FUTURE ORIENTATION INVOLVES DIFFERENT PATHWAYS FOR DIFFERENT STUDENTS

Even though CCRE was supposed to be focused on both college and career readiness, we did see tensions between the two goals. In some schools, staff thought there was too much emphasis on college readiness at the expense of students who might want to go directly into the workforce. Staff in other schools believed that the school had too low of expectations for their students and having students take college courses made other staff more likely to believe that their students could be successful in college.

This tension is likely to remain in any project that is focusing on preparing students for life after high school. We see our term "future orientation" as providing a broader frame that schools can use, even if operationalizing it will require schools to wrestle with the same tensions. Nevertheless, keeping the focus on preparing students for options after high school may help with the balancing act.

VI.7. SUSTAINABILITY REQUIRES INSTITUTIONALIZATION

A final insight from CCRE is that sustaining this work requires institutionalization of practices and procedures. Most people will think about institutionalization at the school level, ensuring that practices—college-level courses, instructional practices, student supports, data usage, teacher collaboration—become part and parcel of the way a school does business. This allows these practices to survive staff turnover.

Institutionalization is also important for the colleges that are providing the supports to the schools. Columbus State has noted that this project resulted in many changes at the College. They have streamlined their policies and changed the way that they interact with the high schools. These practices have also been institutionalized so that they can continue supporting this work into the future.

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APPENDIX A: FIDELITY OF IMPLEMENTATION

Table A.1. Fidelity of Implementation (FOI) of Key Components

Key Component	Indicator (Threshold)	Year 2 FOI Description (2017-18)	Year 3 FOI Description (2018-19)
Key Component 1: Management structure	Participation in regional CCRE Cabinet (District expected to participate in 8 meetings in Year 2, 3 meetings in Year 3)	3 of 7 districts had representation at 8 CCRE Cabinet meetings. District participation ranged from 3 to 8 meetings with an average of 6.4 meetings per district.	7 of 7 districts had representation at 2 CCRE Cabinet meetings. The cancellation of the third Cabinet meeting led to no districts meeting FOI.
	Participation in one-on-one district meetings (District expected to participate in 3 meetings)	One-on-one meetings were not implemented until Year 3.	2 of 7 districts had 3 one-on-one meetings, with all districts having at least 1 meeting. FOI was not met for this indicator.
	Participation in Core Team meetings (District expected to participate in 80% of twice-monthly meetings.)	FOI was not tracked for this indicator in Year 2.	No districts met the threshold of attendance at 16 meetings because only 11 meetings were held. Each district attended 0 to 11 meetings, with an average of 5.7 meetings per district.
Key Component 2: Professional development and coaching for district and school staff (provided by CCRE partners)	Professional development for district staff (Districts expected to participate in more than 48 hours in Year 2 and 12 hours in Year 3)	5 of 7 districts met the threshold of 48 or greater district staff PD hours in 2017-18. The number of PD hours by district ranged from 12 to 91 with an average of 55.0 hours per district.	7 of 7 districts met the threshold of 12 or more district staff PD hours in 2018-19. The number of PD hours by district ranged from 35 to 79, with an average of 50.0 hours per district.
	Professional development for school leadership (Schools expected to participate in more than 48 hours in Year 2 and 32 hours in Year 3)	2 of 16 schools met the threshold of 48 or more school leadership PD hours in 2017-18. The number of PD hours by school ranged from 11 to 86 hours, with an average of 40.5 hours per school.	11 of 16 schools met the threshold of 32 or more school leadership PD hours in 2018-19. The number of PD hours by school ranged from 12 to 63 hours, with an average of 37.5 hours per school.
	Professional development for school staff (Schools expected to participate in at least 30 hours in both years)	13 of the 16 program schools met the threshold of 30 school staff PD hours in 2017-18. The number of PD hours by school ranged from 19 to 130 hours with an average of 49.2 hours per school.	12 of the 16 program schools met the threshold of 30 school staff PD hours in 2018-19. The number of PD hours by school ranged from 18 to 108 hours, with an average of 55.5 hours per school.

Table A.1. Fidelity of Implementation (FOI) of Key Components (continued)

Key Component	Indicator (Threshold)	Year 2 FOI Description (2017-18)	Year 3 FOI Description (2018-19)
Key Component 2: Professional development and coaching for district and school staff (provided by CCRE partners)	Coaching/technical assistance for district staff (District expected to receive technical assistance contacts in at least 8 of 9 months in Year 3)	Discussion with program staff revealed that the coaching for district staff indicator was better framed as "technical assistance" for districts. Program records showed multiple touchpoints of technical assistance from grant partners to all 7 districts in 2017-18.	4 of 7 districts met the threshold of technical assistance contacts in 8 or more months in 2018-19. The number of months with one or more technical assistance contacts ranged from 4 to 9 months, with an average of 7.4 months per district.
	Coaching/technical assistance for school leadership (School leaders expected to receive technical assistance contacts in at least 8 of 9 months in Year 3)	11 of 16 schools met FOI for leadership coaching visits in 2017-18. Principals at program schools received a range of 2 to 15 leadership coaching visits with an average of 9.3 visits per school.	6 of 16 schools met the threshold of technical assistance contacts in 8 or more months in 2018-19. The number of months with 1 or more technical assistance contacts ranged from 0 to 9 months, with an average of 5.3 months per school.
	Coaching/ technical assistance for school staff (School staff expected to receive technical assistance contacts in at least 8 of 9 months in Year 3)	8 of 16 schools met FOI for instructional coaching visits in 2017-18. Schools received a range of 0 to 12 instructional coaching visits with an average of 8.1 visits per school.	5 of 16 schools met the threshold of technical assistance contacts in 8 or more months in 2018-19. The number of months with 1 or more technical assistance contact ranged from 0 to 9 months, with an average of 3.3 months per school.

Table A.1. Fidelity of Implementation (FOI) of Key Components (continued)

Key Component	Indicator (Threshold)	Year 2 FOI Description (2017-18)	Year 3 FOI Description (2018-19)
Key Component 3: Curriculum development and alignment	Support for integrated 9-14 pathways (College expected to provide support to each district)	Columbus State provided support to each district through individual planning sessions and PD events at the College. Project records indicate that 7 of 7 districts received support from the college for pathways in Years 2 and 3. Thus, this indicator was met.	
	Support for work-based learning curriculum (College expected to provide support to each district)	Columbus State provided support to districts via individual planning sessions. Fidelity was met for this indicator.	
	Credit-bearing college success course(College develops course and it is offered in schools).	Columbus State developed and refined COLS 1101 for use in program schools, meeting FOI. FOI was met as the course was offered throughout the CCRE schools. FOI did not require all schools to offer the course; in Fall 2018, the course was offered in 11 of 16 program schools and in Spring 2019, the course was offered in 7 of 16 schools.	
Key Component 4: Professional development for college faculty	PD for college faculty teaching in high schools (80% of faculty attend two sessions).	Columbus State identified 54 instructors delivering courses in CCRE districts in 2017-18. 5 of 54 (9%) faculty members attended two or more sessions, short of the 80% target for this indicator.	Columbus State identified 60 instructors delivering courses in CCRE districts in Fall 2018 and Spring 2019. 12 of 60 (20%) faculty members attended two or more sessions, short of the 80% target for this indicator.
	PD for high school teachers (volunteer adjunct faculty) teaching dual enrollment college courses (80% of faculty attend two sessions)	CCRE districts had from 1 to 25 staff members identified in their district to receive PD as College Credit Plus adjuncts in 2017-18. District percentages of adjunct faculty ranged from 0% to 40%, with no district meeting fidelity for this indicator.	CCRE districts had from 1 to 28 staff members identified in their district to receive PD as College Credit Plus adjuncts in Fall 2018 and Spring 2019. District percentages of adjunct faculty attending 2+ sessions ranged from 0% to 43%, with no district meeting fidelity for this indicator.

Table A.1. Fidelity of Implementation (FOI) of Key Components (continued)

Key Component	Indicator (Threshold)	Year 2 FOI Description (2017-18)	Year 3 FOI Description (2018-19)
Key Component 5: Student support activities (provided by CSCC)	Early alert system—high school classes (Early alert system in place, incorporating college and career readiness indicators—Year 2; system in use—Year 3)	At the end of the 2017-18 school year, no schools had systems that incorporated the required indicators; therefore, FOI was not met for this indicator in Year 2.	In Year 3, the intent was that building-level teams would meet monthly to assess and analyze student level data for at-risk students in the following areas: 1) behavior, 2) academics, and 3) attendance. From interviews, 4 of 7 districts reported having RTI teams that met regularly, and one of those districts also had a centralized data system, although the two parts of the system were not yet connected. FOI was thus not met.
	Early alert system—college classes (Staff trained on early alert system—Year 2; early alert system in use—Year 3)	In Year 2, project records indicated that 16 of 16 CCRE schools had at least one staff member trained on the Starfish platform. Thus, this indicator met FOI for Year 2.	A core set of Columbus State staff monitored the system and ensured that each high school contact received regular updates. Each school had an individual designated to receive Starfish updates. 86% of college course sections in the Fall 2018 and Spring 2019 semesters used Starfish, so FOI was met.
	Academic advising (College advisors are in place for each district)	Program records indicated that advisors from Columbus State were assigned to all CCRE schools and meeting with students on-site during the 2017-18 school year. Thus, this indicator met FOI for Year 2.	The expectation for FOI is that an advisor be in place and provide support to schools and/or students. Given that each school had access to an advisor and that advisors visited schools, this FOI measure is met.
	Tutoring (College provides tutoring for students in each district)	The FOI indicator states, "Academic tutoring is provided to students identified as at-risk." All students who participated in Columbus State classes had access to NetTutor, the online tutoring system, which met the expectations for FOI for both Years 2 and 3.	

Table A.1. Fidelity of Implementation (FOI) of Key Components (continued)

Key Component	Indicator (Threshold)	Year 2 FOI Description (2017-18)	Year 3 FOI Description (2018-19)
Key Component 6: District strategic implementation plan	District strategic implementation plan (District creates plan with early college principles)	All 7 districts submitted strategic plans in the 2017-18 school year. Plans contained strategies aligned with the CCRE Key Components and Early College Design Principles.	5 of 7 districts submitted updated plans to Columbus State in Fall 2018. The plans were used in one-on-one district meetings to guide project implementation. As not all districts submitted a plan, FOI was not met for this indicator.
Key Component 7: Leadership development (provided by school districts)	Coordination and communication (i3 Coordinator in place)	7 of 7 districts had a coordinator in place to manage program activities in both years; thus, the program met FOI.	
	Leadership development for leaders of each school--provided by district staff (District provides 2 days (or 12 hours) of professional development annually).	10 of 16 schools met FOI for hours of district-provided leadership development in 2017-18. CCRE districts provided an average of 21.4 hours of leadership development to schools, ranging from 0 to 39 hours by school.	8 of 16 schools met FOI for hours of district-provided leadership development in 2018-19. CCRE districts provided an average of 11.6 hours of leadership development to schools, ranging from 0 to 27 hours by school.
Key Component 8: Professional development to school staff (provided by districts)	PD for school building staff, provided by the school district (School staff participate in more than 12 hours annually)	12 of 16 met FOI for hours of district-provided school staff PD in 2017-18. CCRE districts provided an average of 26.1 hours of PD to school staff, ranging from 0 to 50 hours by school.	11 of 16 met FOI for hours of district-provided school staff PD in 2018-19. CCRE districts provided an average of 14.4 hours of PD to school staff, ranging from 0 to 28 hours by school.

Table A.1. Fidelity of Implementation (FOI) of Key Components (continued)

Key Component	Indicator (Threshold)	Year 2 FOI Description (2017-18)	Year 3 FOI Description (2018-19)
Key Component 9: Creation of integrated 9-14 pathways with work-based learning support	Integrated 9-14 pathways (Pathways developed and implemented)	11 of 16 schools in 5 of 7 districts provided evidence of developed pathways.	7 of 7 districts provided documentation of pathways that included college coursework. For districts with multiple high schools, not all pathways were available at all schools, but there was evidence that students in each program high school had access to at least one integrated pathway, which indicates that FOI was met for this indicator.
	Integration of work-based learning practices in 9-14 pathways (Pathways include work-based learning activities as appropriate)	Program records did not indicate the integration of work-based learning into 9-14 pathways.	The pathway documentation for 4 of 7 districts included references to work-based learning, particularly internships. There is also evidence from interviews that career awareness activities occurred in schools. However, the lack of explicit integration of work-based learning into each district's pathway indicates that the indicator was not fully met.

APPENDIX B: REPRESENTATIVENESS

These representativeness tables are intended to demonstrate that the school-level baseline equivalence and the outcome analyses were calculated on samples that met WWC's representativeness criteria.

Table B-1. Representativeness for the Ninth Grade On-Track Sample

School Year	Treatment Status	Number of 9th Grade Students in Analytic Sample	Number of 9th Grade Students in State-Level Enrollment File	Group Attrition Percentage
Baseline Year (2015-16)	Treatment	3,918	4,873	19.6%
	Comparison	7,454	9,185	18.8%
	Total	11,372	14,058	19.1%
	Differential Attrition			0.8%
Outcome Year 2 (2017-18)	Treatment	3,923	4,990	21.4%
	Comparison	7,701	9,541	19.3%
	Total	11,624	14,531	20.0%
	Differential Attrition			2.1%
Outcome Year 3 (2018-19)	Treatment	3,830	4,758	19.5%
	Comparison	7,153	8,727	18.0%
	Total	10,983	13,485	18.6%
	Differential Attrition			1.5%

Table B-2. Representativeness for the Tenth Grade On-Track Sample

School Year	Treatment Status	Number of 9th Grade Students in Analytic Sample	Number of 9th Grade Students in State-Level Enrollment File	Group Attrition Percentage
Outcome Year 3	Treatment	3,422	4,271	19.9%
	Comparison	6,582	8,036	18.1%
	Total	10,004	12,307	18.7%
	Differential Attrition			1.8%

Note: Baseline for this outcome is the 9th grade on-track sample, shown in Table B-1.

Table B-3 includes representativeness for both the confirmatory sample (students who met the ADM threshold but may have had missing achievement data) and the analytic sample used for the sensitivity analysis (students with no missing data).

Table B-3. Representativeness for the Dropout Sample

Outcome	Treatment Status	Number of Students in Analytic Sample	Number of Students in State-Level Enrollment File	Group Attrition Percentage
Baseline Year (2015-16)[a]	Treatment	14,373	15,416	8.4%
	Comparison	28,389	30,999	6.8%
	Total	42,762	46,415	7.9%
	Differential Attrition			1.7%
Outcome Year 3 (2018-19)[a]	Treatment	14,875	16,035	7.2%
	Comparison	27,845	30,449	8.6%
	Total	42,720	46,484	8.1%
	Differential Attrition			1.4%
Outcome Year 3 with No Missing Data (2018-19)	Treatment	13,382	16,035	16.5%
	Comparison	25,593	30,449	15.9%
	Total	38,975	46,484	16.2%
	Differential Attrition			0.6%

[a]This sample includes all students with missing data and represent the sample used in the confirmatory analysis.

Table B-4. Representativeness Summary—College Course Enrollment

School Year	Treatment Status	Number of 10th -12th Grade Students in Analytic Sample	Number of 10th–12th Grade Students in State-Level Enrollment File	Group Attrition Percentage
Baseline Year (2015-16)	Treatment	10,603	10,543	-0.6%[a]
	Comparison	22,161	21,814	-1.6%[a]
	Total	32,764	32,357	-1.3%[a]
	Differential Attrition			1.0%
Outcome Year 3 (2018-19)	Treatment	10,192	11,277	9.6%
	Comparison	20,524	21,722	5.5%
	Total	30,716	32,999	6.9%
	Differential Attrition			4.1%
Outcome Year 4 (2019-20)	Treatment	10,737	11,202	4.2%
	Comparison	21,104	21,528	2.0%
	Total	31,841	32,730	2.7%
	Differential Attrition			2.2%

[a]We used the same ADM threshold to identify the sample for baseline measures and for the outcome measures. For the baseline measures, we did not exclude students with missing achievement data (although we did for the outcome measures). As a result, the number of students included in our baseline measures actually exceeds the enrollment numbers in the ODE data. Attrition for these measures at baseline can be considered to be 0%.

Table B-5. Representativeness Summary—College Credits Earned by Graduates

School Year	Treatment Status	Number of Students in Outcome 5 2015-16 Baseline Sample	Number of Students in the Grad Core Sample from Study Schools	Group Attrition Percentage
Baseline Year (2015-16)	Treatment	2,665	2,665	0.0%
	Comparison	6,039	6,039	0.0%
	Total	9,704	9,704	0.0%
	Differential Attrition			0.0%
Outcome Year 3 (2018-19)	Treatment	3,060	3,362	9.0%
	Comparison	6,424	6,858	6.3%
	Total	9,484	10,220	7.2%
	Differential Attrition			2.7%
Outcome Year 4 (2019-20)	Treatment	3,122	3,222	5.0%
	Comparison	6,615	6,829	5.9%
	Total	9,737	10,051	5.6%
	Differential Attrition			0.9%

[a]There is no attrition for the baseline year because the sample includes all students in the graduation file.

APPENDIX C: SURVEY SCALES

Table C-1. Survey Scales Summary

Scale Reliability Estimate	Sample Items	Response Options
Common Instructional Framework (CIF) α = 0.92	*This school year, how frequently have you...* • Asked students to explain their thinking in class? • Had students work together on projects or assignments? • Made connections between material covered previously and new content?	1- Never 2- A few times this year 3- Once or twice a month 4- Once or twice a week 5- Almost every day
Student Enrollment in Advanced Courses and Postsecondary Pathways α = 0.76	*This year, what percentage of your students are...* • Enrolled in one or more Advanced Placement (AP) courses? • Enrolled in a pathway containing both high school and college credit courses? • On track to earn 3+ college credits before high school graduation?	1- Not offered 2- Less than 25% 3- 25% to 50% 4- 51% to 75% 5- Greater than 75%
Strong Postsecondary Partnership α = 0.89	*This school year, how many times did you participate in the following activities that involved collaboration between the high school and CSCC?* • Meetings to plan the college courses that high school students may take. • Meetings with college faculty to establish curriculum alignment. • Meetings with college faculty to discuss student support.	1- Never 2- 1–2 times 3- 3–6 times 4- More than 6 times
Postsecondary Partnership with Columbus State α = 0.92	*Please indicate the degree to which you agree or disagree with each of the following statements regarding the partnership between your school and Columbus State Community College (CSCC).* • We have a strong partnership between our school and Columbus State Community College (CSCC). • Our students have access to college resources and facilities at CSCC. • My school and CSCC collaborate to provide support to students in college courses.	1- Strongly disagree 2- Disagree 3- Somewhat disagree 4- Somewhat agree 5- Agree 6- Strongly agree

Table C-1. Survey Scales Summary (continued)

Scale Reliability Estimate	Sample Items	Response Options
Student Participation in Work-Based Learning Activities α = 0.62	*How many students in your school participate in the following activities at some point before they graduate?* • Work study programs. • Career internship or on-the-job learning (such as job shadowing or apprenticeships). • Take a career assessment survey and review the results with a staff member or mentor.	1- Not offered 2- Fewer than 25% 3- 25% to 50% 4- 51% to 75% 5- Greater than 75%
Student Participation in College Headstart Activities α = 0.77	*Please estimate the percentage of students who receive the following services from the school at some point during their high school experience.* • Structured advising on skills students need in college (e.g., notetaking skills, time management, self-advocacy, etc.). • Tours of college campuses. • Tutoring or mentoring from current college students.	1- Not offered 2- Fewer than 25% 3- 25% to 50% 4- 51% to 75% 5- Greater than 75%
College Skills Instruction—Administrators α = 0.96	*How frequently have most of your students received explicit training in the following areas **in standard academic courses**, that is, NOT in specific college readiness courses.* • Time management. • Note taking. • Advocating for themselves with high school and college faculty.	1- Never 2- A few times this year 3- Once or twice a month 4- Once or twice a week 5- Almost every day
College Skills Instruction—Teachers α = 0.84	*In the current school year, how frequently have you explicitly taught in the following skills to students in your classes...* • Time management. • Note taking. • Advocating for themselves with high school and college faculty.	1- Never 2- A few times this year 3- Once or twice a month 4- Once or twice a week 5- Almost every day

Table C-1. Survey Scales Summary (continued)

Scale Reliability Estimate	Sample Items	Response Options
Student Receipt of Academic and Social/Emotional Support α = 0.93	*Please estimate the percentage of students who receive the following services from the school.* • Advising on courses to take to prepare for college. • Academic tutoring connected to a specific class. • Sessions or classes to help students cope with social or emotional issues.	1- Not offered 2- Fewer than 25% 3- 25% to 50% 4- 51% to 75% 5- Greater than 75%
Presence of Student Supports α = 0.84	*Please mark the extent to which you agree or disagree with the following statements about the academic and social supports for students in your school.* • I regularly provide academic supports to students who need it. • Our school has a system to identify students in need of social/ emotional support. • All students have opportunities to get academic support during the school day.	1- Strongly disagree 2- Disagree 3- Somewhat disagree 4- Somewhat agree 5- Agree 6- Strongly agree
Perceptions of Leadership α = 0.92	*Please indicate the extent to which you agree or disagree with the following statements about the leadership team at your school:* • Provides effective leadership at this school. • Monitors instruction on a regular basis. • Actively supports collaboration among staff members.	1- Strongly disagree 2- Disagree 3- Somewhat disagree 4- Somewhat agree 5- Agree 6- Strongly agree
Structures to Support Personalized Relationships α = 0.92	*Please mark the extent to which you agree or disagree that the following statements about the relationships in your school.* • Faculty and staff members respect all the students in this school. • Faculty and staff in this school believe that all students can do well. • Mentors or advisers regularly meet with students.	1- Strongly disagree 2- Disagree 3- Somewhat disagree 4- Somewhat agree 5- Agree 6- Strongly agree

Table C-1. Survey Scales Summary (continued)

Scale Reliability Estimate	Sample Items	Response Options
College-Going Culture α = 0.92	*Please mark the extent to which you agree or disagree with the following statements about the college readiness for students in your school.* • The faculty and staff in this school expect every student to have the opportunity to receive postsecondary education or training. • The faculty and staff at the school focus on specific activities that lead to enrollment in a postsecondary institution. • The vision of this school is tied to preparing every student for postsecondary education without remediation.	1- Strongly disagree 2- Disagree 3- Somewhat disagree 4- Somewhat agree 5- Agree 6- Strongly agree
Data-Based Decision-Making Activities α = 0.82	*How frequently do you participate in the following activities?* • Analyze student progress or performance data. • Use data to make decisions about modifying instructional practices in your classroom or school. *How frequently have the following activities occurred at your school over the past year?* • Our school collected or received data on student performance in college classes. • High school staff used data on student performance in college classes to improve curriculum and instruction.	1- Never 2- A few times this year 3- Once or twice a month 4- Once or twice a week
Understanding of CCRE and Partnership with CSCC α = 0.96	*Please indicate the extent to which you agree or disagree with the following statements about the College and Career Readiness Expansion partnership with Columbus State Community College funded through the i3 grant regarding shared understanding.* • I understand what it means to implement CCRE-related college and career readiness activities in my school. • I understand the components of the partnership with Columbus State Community College for which I am responsible. • I understand how the components of support provided through our partnership with Columbus State Community College work together.	1- Strongly disagree 2- Disagree 3- Somewhat disagree 4- Somewhat agree 5- Agree 6- Strongly agree

Table C-1. Survey Scales Summary (continued)

Scale Reliability Estimate	Sample Items	Response Options
Communication about Early College Strategies α = 0.93	*The Career and College Readiness Expansion Program is intended to help schools implement Early College strategies in their schools. Please indicate the extent to which you agree or disagree with the following statements regarding communication about Early College strategies:* • Our school leadership has clearly articulated the purpose of implementing Early College strategies in our school. • Program staff members from outside our building have clearly articulated the purpose of implementing Early College strategies in our school. • The goals of the Early College partnership are frequently reinforced by district staff and other representatives supporting Early College strategies (e.g., staff from ESC and JFF).	0- Don't know 1- Strongly disagree 2- Disagree 3- Somewhat disagree 4- Somewhat agree 5- Agree 6- Strongly agree
Beliefs about Early College Strategies α = 0.93	*The Career and College Readiness Expansion Program is intended to help schools implement Early College strategies in their schools. Please indicate the extent to which you agree or disagree with the following statements regarding beliefs and motivation about Early College strategies:* • I strongly value the kinds of changes called for by implementing CCRE-related college and career readiness activities in my school. • I am personally motivated to make CCRE-related college and career readiness activities work in my school. • The leadership team enthusiastically participates in activities related to implementing CCRE-related college and career readiness activities.	0- Don't know 1- Strongly disagree 2- Disagree 3- Somewhat disagree 4- Somewhat agree 5- Agree 6- Strongly agree
Action Toward Implementing Early College Strategies α = 0.88	*Please indicate the extent to which you agree or disagree with the following statements regarding support and action relative to Early College strategies:* • I am capable of making the kinds of changes needed to implement CCRE-related college and career readiness activities. • I have the support I need to implement CCRE-related college and career readiness activities in my school. • The leadership team takes specific actions to support CCRE-related college and career readiness activities in our school.	0- Don't know 1- Strongly disagree 2- Disagree 3- Somewhat disagree 4- Somewhat agree 5- Agree 6- Strongly agree

Table C-1. Survey Scales Summary (continued)

Scale Reliability Estimate	Sample Items	Response Options
Ongoing Job Embedded PD	*How much professional development have you received in the following areas over the past year?* • Instructional strategies in your content area. • College and career readiness (e.g., course selection, time management, etc.).	0-None 1- A single presentation 2-Multiple sessions 3-Multiple sessions with on-site follow-up
Time and Support for Teacher Collaboration	*How frequently do you collaborate with other school staff on the following:* • Lesson or unit planning • Peer observations & feedback • Using research or data to improve instruction	1- Never 2- A few times this year 3- Once or twice a month 4- Once or twice a week 5-Almost every day

APPENDIX D: SUPPLEMENTAL ANALYSES

Table D.1. Subgroup Analysis for Taking Either CCP or AP Courses

Population	Grade Levels	Treat N	Comp N	Adj. Treat Mean	Unadj. Comp Mean	Impact Estimate	Effect Size (Cox's Index)	*p* value
All Students	Grades 10-12	20,929 (16 sch)	41,628 (32 sch)	29.9%	22.7%	+7.2pp**	0.225	0.003
Economically Disadvantaged	Grades 10-12	12,758 (16 sch)	24,685 (32 sch)	22.8%	15.1%	+7.7pp**	0.307	0.002
Not Economically Disadvantaged	Grades 10-12	8,171 (12 sch)	15,886 (21 sch)	43.4%	33.7%	+9.6pp**	0.248	0.008
Underrepresented Race/ Ethnicity	Grades 10-12	9,928 (16 sch)	20,126 (32 sch)	21.2%	14.4%	+6.8pp**	0.286	0.005
Not Underrepresented Race/Ethnicity	Grades 10-12	11,001 (16 sch)	21,458 (29 sch)	39.2%	30.5%	+8.7pp**	0.232	0.004
All Students	Grades 11-12	13,216 (16 sch)	26,638 (32 sch)	36.3%	29.1%	+7.3pp*	0.201	0.011
Economically Disadvantaged	Grades 11-12	7,777 (16 sch)	15,515 (32 sch)	27.4%	18.9%	+8.5pp**	0.293	0.006
Not Economically Disadvantaged	Grades 11-12	5,439 (12 sch)	10,453 (21 sch)	53.4%	43.3%	+10.2pp*	0.248	0.010
Underrepresented Race/ Ethnicity	Grades 11-12	6,162 (16 sch)	12,879 (32 sch)	26.2%	18.2%	+8.0pp**	0.284	0.009
Not Underrepresented Race/Ethnicity	Grades 11-12	7,054 (16 sch)	13,732 (29 sch)	47.9%	39.3%	+8.6pp*	0.213	0.016
All Students	Grade 10	7,713 (16 sch)	14,990 (32 sch)	18.8%	11.4%	+7.4pp**	0.356	0.003
Economically Disadvantaged	Grade 10	4,981 (16 sch)	9,170 (32 sch)	15.5%	8.8%	+6.7pp**	0.391	0.004
Not Economically Disadvantaged	Grade 10	2,732 (12 sch)	5,433 (19 sch)	25.0%	15.4%	+9.6pp*	0.366	0.028
Underrepresented Race/ Ethnicity	Grade 10	3,766 (16 sch)	7,247 (32 sch)	13.8%	7.7%	+6.2pp**	0.399	0.007
Not Underrepresented Race/Ethnicity	Grade 10	3,947 (16 sch)	7,726 (29 sch)	24.7%	14.9%	+9.9pp**	0.384	0.001

*Statistically significant at $p < .05$; **Statistically significant at $p < .01$.

Table D.2. Subgroup Analysis for Taking College Credit Plus Courses

Population	Grade Levels	Treat N	Comp N	Adj. Treat Mean	Unadj. Comp Mean	Impact Estimate	Effect Size (Cox's Index)	*p* value
All Students	Grades 10-12	20,929 (16 sch)	41,628 (32 sch)	20.7%	13.4%	+7.3pp***	0.318	0.000
Economically Disadvantaged	Grades 10-12	12,758 (16 sch)	24,685 (32 sch)	16.2%	7.1%	+9.1pp***	0.560	0.000
Not Economically Disadvantaged	Grades 10-12	8,171 (12 sch)	15,886 (21 sch)	27.6%	22.8%	+4.8pp	0.155	0.123
Underrepresented Race/ Ethnicity	Grades 10-12	9,928 (16 sch)	20,126 (32 sch)	14.8%	7.2%	+7.7pp***	0.494	0.000
Not Underrepresented Race/Ethnicity	Grades 10-12	11,001 (16 sch)	21,458 (29 sch)	27.3%	19.2%	+8.1pp**	0.277	0.001
All Students	Grades 11-12	13,216 (16 sch)	26,638 (32 sch)	25.5%	18.5%	+7.0pp**	0.248	0.004
Economically Disadvantaged	Grades 11-12	7,777 (16 sch)	15,515 (32 sch)	19.1%	9.6%	+9.5pp***	0.483	0.000
Not Economically Disadvantaged	Grades 11-12	5,439 (12 sch)	10,453 (21 sch)	36.3%	31.2%	+5.0pp	0.137	0.171
Underrepresented Race/ Ethnicity	Grades 11-12	6,162 (16 sch)	12,879 (32 sch)	18.0%	9.7%	+8.3pp**	0.431	0.001
Not Underrepresented Race/Ethnicity	Grades 11-12	7,054 (16 sch)	13,732 (29 sch)	35.3%	26.7%	+8.6pp**	0.245	0.004
All Students	Grade 10	7,713 (16 sch)	14,990 (32 sch)	12.0%	4.2%	+7.8pp***	0.684	0.000
Economically Disadvantaged	Grade 10	4,981 (16 sch)	9,170 (32 sch)	10.5%	2.9%	+7.6pp***	0.832	0.000
Not Economically Disadvantaged	Grade 10	2,732 (12 sch)	5,433 (19 sch)	12.4%	6.6%	+5.9pp	0.427	0.127
Underrepresented Race/ Ethnicity	Grade 10	3,766 (16 sch)	7,247 (32 sch)	9.7%	2.6%	+7.1pp***	0.851	0.000
Not Underrepresented Race/Ethnicity	Grade 10	3,947 (16 sch)	7,726 (29 sch)	14.4%	5.8%	+8.5pp**	0.605	0.003

**Statistically significant at $p < .01$; ***Statistically significant at $p < .001$.

Table D.3. Subgroup Analysis for Taking College Credit Plus Courses

Population	Grade Levels	Treat N	Comp N	Adj. Treat Mean	Unadj. Comp Mean	Impact Estimate	Effect Size (Cox's Index)	*p* value
All Students	Grades 10-12	20,929 (16 sch)	41,628 (32 sch)	14.5%	13.5%	+1.0pp	0.052	0.653
Economically Disadvantaged	Grades 10-12	12,758 (16 sch)	24,685 (32 sch)	10.6%	10.1%	+0.5pp	0.032	0.826
Not Economically Disadvantaged	Grades 10-12	8,171 (12 sch)	15,886 (21 sch)	24.7%	17.7%	+7.1pp*	0.258	0.019
Underrepresented Race/ Ethnicity	Grades 10-12	9,928 (16 sch)	20,126 (32 sch)	10.0%	9.6%	+0.4pp	0.025	0.856
Not Underrepresented Race/Ethnicity	Grades 10-12	11,001 (16 sch)	21,458 (29 sch)	19.4%	17.1%	+2.2pp	0.091	0.445
All Students	Grades 11-12	13,216 (16 sch)	26,638 (32 sch)	17.9%	16.6%	+1.3pp	0.053	0.662
Economically Disadvantaged	Grades 11-12	7,777 (16 sch)	15,515 (32 sch)	13.5%	12.3%	+1.2pp	0.064	0.672
Not Economically Disadvantaged	Grades 11-12	5,439 (12 sch)	10,453 (21 sch)	28.8%	21.8%	+7.1pp	0.227	0.065
Underrepresented Race/ Ethnicity	Grades 11-12	6,162 (16 sch)	12,879 (32 sch)	13.3%	11.9%	+1.4pp	0.075	0.596
Not Underrepresented Race/Ethnicity	Grades 11-12	7,054 (16 sch)	13,732 (29 sch)	23.0%	21.1%	+1.9pp	0.066	0.617
All Students	Grade 10	7,713 (16 sch)	14,990 (32 sch)	8.5%	7.9%	+0.6pp	0.051	0.730
Economically Disadvantaged	Grade 10	4,981 (16 sch)	9,170 (32 sch)	6.0%	6.4%	-0.4pp	-0.042	0.819
Not Economically Disadvantaged	Grade 10	2,732 (12 sch)	5,433 (19 sch)	17.0%	9.8%	+7.2pp*	0.382	0.016
Underrepresented Race/ Ethnicity	Grade 10	3,766 (16 sch)	7,247 (32 sch)	5.2%	5.5%	-0.3pp	-0.042	0.820
Not Underrepresented Race/Ethnicity	Grade 10	3,947 (16 sch)	7,726 (29 sch)	13.0%	10.1%	+2.9pp	0.175	0.226

*Statistically significant at $p < .05$

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