Year 2 Impacts of North Carolina's Rural Innovative Schools Project

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The U.S. economy is dramatically changing in the 21st century with careers in fields that were never previously imagined (Carnevale & Desrochers, 2003). Economists predict that many of these new careers will require at least some schooling beyond high school (Carnevale, Smith, & Strohl, 2010). Yet too many high school students do not enroll in and graduate from college. For example, out of an estimated 70% of high school graduates who immediately enter some form of postsecondary education, only about half (49%) attain some type of postsecondary credential within six years (Ross et al., 2012). To increase the number of students enrolling and succeeding in postsecondary education, educators and policymakers have been exploring ways of expanding students' access to college courses while they are still in high school. Early college high schools are one approach that has been successful.

Early colleges are high school reform efforts that merge the high school and college experience. The original models were primarily small schools of choice located on college campuses. Purposefully created environments focused on college readiness for all students (Edmunds, 2012), early colleges are targeted at students who are underrepresented in college. They serve students starting in 9th grade going through grades 12 or 13, with the expectation that students graduate with a high school diploma and an associate degree or two years of college credit. Although there is a key focus on college credit access, early colleges also incorporate other characteristics of a high quality high school including rigorous and relevant instructional practices, wraparound student supports, ongoing staff collaboration and professional development, and flexible use of time and resources (North Carolina New Schools, 2013). Experimental studies of these schools have shown that they had positive impacts on a host of secondary and postsecondary outcomes. Early college students were more likely to successfully complete a college preparatory course of study (Edmunds, Arshavsky, & Fesler, 2015; Edmunds, Bernstein, Unlu, Glennie, Willse, et al., 2012). They also had higher attendance, fewer suspensions, and were more likely to graduate from high school than students in the control group (Berger et al., 2013; Edmunds, Bernstein, Unlu, Glennie, Smith, et al., 2012; Edmunds, Willse, Arshavsky, & Dallas, 2013). Finally, early college students enrolled in postsecondary education at higher rates and were more likely to receive a postsecondary credential (Berger, Turk-Bicakci, Garet, Knudson, & Hoshen, 2014; Berger, et al., 2013; Edmunds et al., in press).

Although the model was seen as successful, there were concerns about the extent to which early colleges—conceptualized as small schools on college campuses—could be scaled to serve many more students. As a result, groups began exploring the possibilities of implementing early colleges in other settings, particularly in comprehensive high schools. A total of five projects have been funded through the U.S. Department of Education's Investing in Innovation (i3) program that sought to implement early college strategies in comprehensive high schools. This paper presents early impacts from the first of those projects, The Rural Innovative Schools (RIS)

Project, which was funded by a 2011 i3 Validation grant awarded to North Carolina New Schools. Specifically, this paper focuses on the following research question:

> What has been the impact of participation in the RIS Project on student outcomes including student enrollment and success in college-credit bearing courses (dual credit and AP); graduation rates; student attendance; dropout rates; and successful completion of college preparatory courses?

Conceptual Framework

To help ensure that students are better prepared for continued education after graduation, educators and policymakers have worked to implement strategies at the high school level. These strategies include ensuring that students have the academic preparation they need, assisting students in making the transition to college, and providing early access to college courses. The early college model incorporates all of these strategies to create a school experience focused on postsecondary readiness. In this section, we briefly discuss these primary strategies and then summarize the research completed to date on early college high schools.

Strategies to promote college readiness

Academic preparation. Students need sufficient academic preparation to be able to succeed in further postsecondary education (Tierney, Bailey, Constantine, Finkelstein, & Hurd, 2009). Academic preparation is considered in several different ways. One is the content that is necessary to succeed in postsecondary courses, often considered as coming from a core set of college preparatory courses (Finkelstein & Fong, 2008). Thus, policymakers in many states have shifted to making a college preparatory curriculum the default curriculum for all students.

Part of academic preparation is also ensuring that students have the thinking and communication skills that they need to be successful (Conley, 2011). Schools can address this concern by focusing on critical thinking and writing and oral communication skills in their classroom instruction.

Facilitating the transition to college. Many students, especially those who are first generation college-goers, can struggle with the process of applying to college, including filling out application forms, applying for financial aid, and identifying and taking the required entrance exams (Roderick, Nagaoka, Coca, & Moeller, 2008). A key strategy for helping students prepare for college is helping through the logistics of selecting and applying for the right college as well as applying for financial aid (Tierney, et al., 2009).

Providing early access to college courses. More and more schools have been trying to expand students' access to college courses while they are in high school, either through Advanced Placement courses or through dual enrollment options (Iatarola, Conger, & Long, 2011). Many students prefer dual enrollment because passing the course gives them college credit, unlike AP courses where students need also to pass an exam to get college credit.

Early college model

The early college model integrates the strategies described above—improving students' academic preparation, explicitly focusing on the transition to college, and providing early access to college courses—with other aspects of a high quality learning environment such as strong teacher-student relationships, academic and affective supports, and a professional working environment for the staff in the school.

The first iteration of the early college model was in small schools (less than 400 students) frequently located on college campuses. These were schools of choice to which students chose to attend. Two experimental studies have been conducted on this model. The first study, conducted in 19 early colleges in North Carolina, was a longitudinal experimental study led by the primary author of this paper. The study used a lottery-based experimental design in which some students who applied to attend the early college were assigned to go to the early college, and some students were assigned to business as usual, most often the comprehensive high school in the district (Edmunds, Bernstein, Unlu, Glennie, Willse, et al., 2012). The second study was a retrospective, lottery-based experimental design that looked at the impact of the model in 10 schools around the country (Berger, et al., 2013). Both studies found positive impacts on students' enrollment in college and receipt of a postsecondary credential (Berger, et al., 2013; Edmunds, et al., in press). The Edmunds et al. study also found positive impacts on students' engagement in school (Edmunds, et al., 2013), their attendance and behavior, and their completion of a college preparatory course of study (Edmunds, Bernstein, Unlu, Glennie, Willse, et al., 2012; Edmunds et al., 2015). Given the positive findings, there was substantial interest in seeing if regular, comprehensive high schools could also implement early college strategies.

Rural Innovative Schools Intervention

Building on the research from the small early college, the Rural Innovative Schools (RIS) project sought to apply principles from the small early college intervention to a total of 18 comprehensive high schools in rural, low-wealth districts in North Carolina.

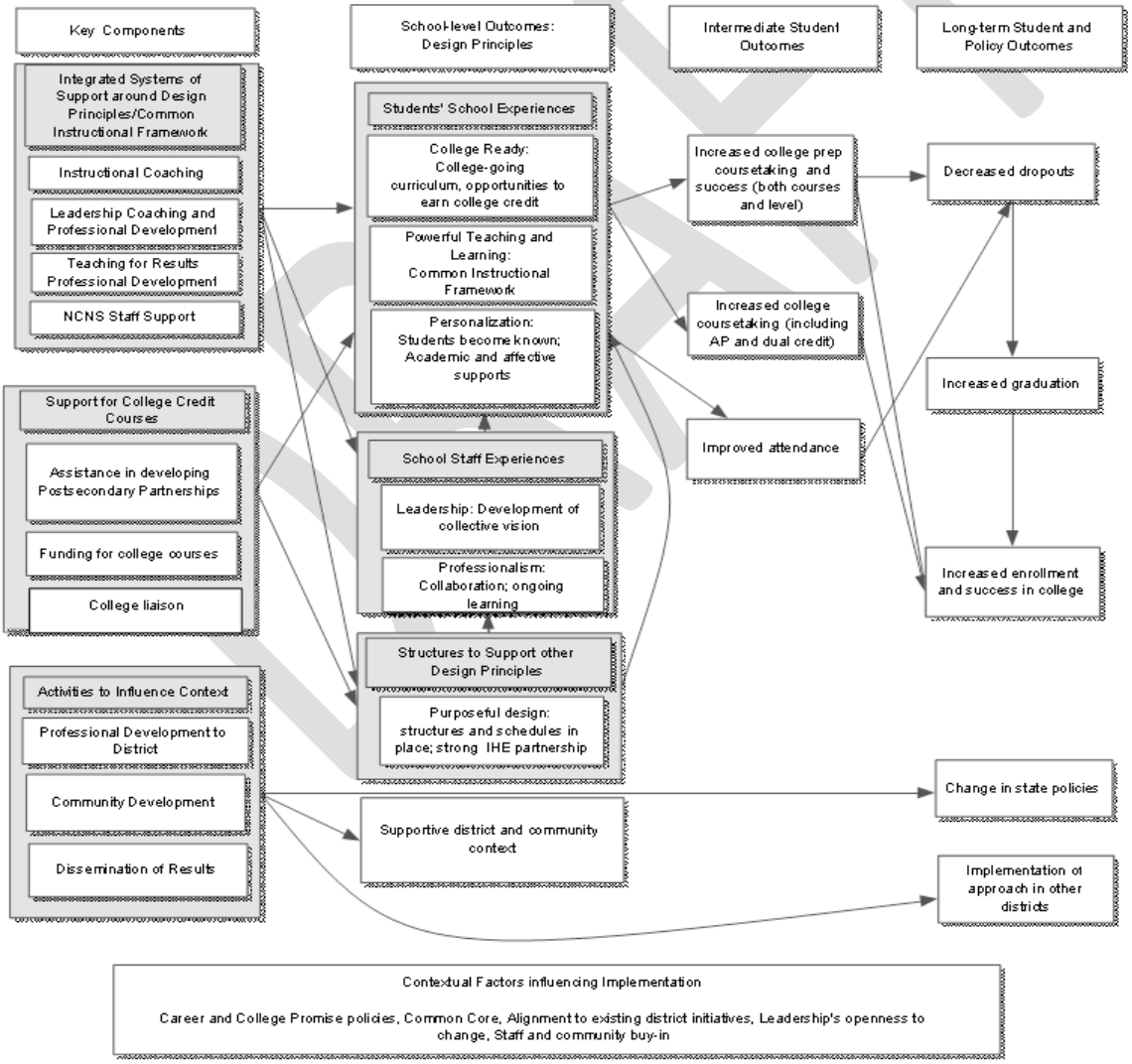
Managed by North Carolina New Schools (NC New Schools), the RIS project began working with schools in the summer of 2012. The project was supposed to end in December of 2016 when the grant funding ended; however, the project ended abruptly in May of 2016 when NC New Schools declared bankruptcy. The RIS project included a set of program services, or Implementation Supports, that were intended to support the implementation of the early college model in traditional high schools. These Implementation Supports included: 1.) extensive professional development and coaching activities; 2.) funding for college courses, support for a college liaison, and assistance in developing postsecondary partnerships; and 3.) community development work.

As a result of the services described above, each school was expected to implement six Design Principles that represent characteristics of an effective high school. These Design Principles, as articulated by NC New Schools, were as follows: 1.) ensuring that students were *College Ready*; 2.) *Powerful Teaching and Learning*, instilling student-centered teaching practices in schools; 3.) *Personalization*, providing academic and affective supports and improving staff-student

relationships; 4.) *Professionalism*, including collaboration and ongoing professional development for school staff; 5.) creating *Leadership* that develops a collective vision; and 6.) implementing a *Purposeful Design* in which school structures support the five other principles (North Carolina New Schools, 2013). A primary emphasis of the program was increasing the number of students who participated in college credit-bearing courses while in high school.

The program services and implementation of the Design Principles were expected to lead to positive impacts on graduation rates, on the percentage of students successfully completing college preparatory courses, and on students' enrollment in and completion of college credit bearing courses. In addition, the project sought to influence policy such that more students could have access to the benefits of early college. Figure 1 presents a logic model that serves as a pictorial representation of the program's core components and the expected changes in school- and student-level outcomes. This logic model guided both the program implementation and the study design.

Figure 1: The Rural Innovative High Schools Logic Model



Methodology

The impact study for this project used a quasi-experimental design in which the 18 RIS schools were matched to a set of 18 comparable schools. As noted earlier, the specific research question driving this study was:

> What has been the impact of participation in the RIS Project on student outcomes including student enrollment and success in college-credit bearing courses (dual credit and AP); graduation rates; student attendance; dropout rates; and successful completion of college preparatory courses?

Outcomes and Data Sources

The impact study utilized extant administrative data from the North Carolina Department of Public Instruction (NCDPI) that was housed at the North Carolina Education Research Data Center at Duke University. The specific outcomes are listed below, along with how that outcome was defined and the specific sample of students that were incorporated in the analyses. All outcomes were examined for schools that were in the second year of implementation of the project.

Outcome A: Percent of students who have enrolled in at least 1 College-Credit Bearing- Course by the end of 11th grade. A primary goal of the intervention was to increase the number of students who have access to college-credit-bearing courses. This measure was therefore designed to look at the percentage of the student body given access to these courses. This outcome included any course that had the potential to bear college credit, including Advanced Placement, International Baccalaureate and dual enrollment courses. A student was coded as taking a college-credit-bearing course if they had enrolled in at least one AP, IB, or dual enrollment course at any point in their high school career by the end of 11th grade. The sample for this outcome was the full sample of 11th grade students in schools in at least their second year of implementation.

Outcome B: Average number of college-credit bearing courses students have taken and passed by the end of 12th grade. This measure was similar to the first measure, but where the first measure spoke to access, this measure tried to get at the depth of the students' experiences with college credit through the number of courses successfully completed. NC New Schools had a goal of having at least 50% of students successfully completing at least 21 college credits. Students were identified as having taken either AP, IB, or dual enrollment courses. To be indicated as receiving college credit in a dual enrollment course, students were required to receive a grade of C or higher, which was the level accepted for college course transfer by UNC Chapel Hill. To receive college credit for an AP or IB course, students had to pass the exam associated with the course. For purposes of this study, a level 3 on the AP exam (which is the level accepted by many colleges) was assumed to represent the receipt of college credit. Unfortunately, we did not have access to IB exam scores; given the relatively small number of North Carolina students who have taken IB exams (approximately 5,000 in 2009, the vast majority of which were in urban areas not a part of this study), we did not consider this as problematic.

This outcome was cumulative over the high school career and included all college courses taken at any point. The sample for this outcome was the full sample of 12th grade students in schools in at least their second year of implementation. All students who were associated with the school in 12th grade were included. Transfers out were excluded, but transfers in were included.

Outcome C: Cohort graduation rate. NC New Schools had a goal of increasing the graduation rate by 10 percentage points by the end of the fifth year. This outcome was a school-level outcome that was calculated by NCDPI. NCDPI calculated a four-year cohort graduation rate that involved identifying each student who enrolled in 9th grade in the school four years earlier and determining whether that student graduated, transferred to another school, or did not graduate for any reason. The graduation rate's denominator was the number of students who were in 9th grade four years earlier, excluding any students who died or transferred to another school (students who were missing remain in the denominator). The numerator was the number of students who graduated.

Outcome D: Attendance. Student attendance has been positively associated with progress in school (Lee & Burkham, 2003); changes in student attendance are therefore seen as a reliable indicator of students' likelihood of remaining in school. The impact study examined the number of days that a student was absent from school. The intervention was expected to result in a reduction of two days of absence. The sample for this outcome was all students in the school. Students who transferred in were included in the analyses. Students who transferred out, dropped out, or were otherwise missing attendance data were excluded from the analyses.

Outcome E: Dropout rate. This measure examined the dropout rate for each school. Students in the dropout file were students who either completed a form indicating that they were dropping out of school or had the school indicate that they dropped out. Students who were not listed in the dropout file were considered not to have dropped out. The sample for this outcome was students in grades 10-12. Students who transferred out were excluded from the analyses, but students who transferred in were included. Students who dropped out were included in the analyses.

Outcome F: College preparatory course-taking. This measure looked at the proportion of students taking a core set of college preparatory courses at the 9th grade level. The courses included those that would ensure that a student was on-track for entrance into the University of North Carolina system. In 9th grade, these courses were English I and at least one college preparatory mathematics course (Algebra I, Geometry, Algebra II, Integrated Math I). Examining the percentage of students taking these courses was a measure of the extent to which the school provided access to courses needed for college to a wide range of students. Students who dropped out were assumed to have not taken college prep courses after dropping out.

This outcome was examined for 9th graders because college preparatory classes are sequential starting in 9th grade; it is extremely difficult for students who are off-track in 9th grade to get back on track (Finkelstein & Fong, 2008). Students who transferred in were included and students who transferred out were excluded.

Outcome G: College preparatory course-taking and success. Very closely related to the previous measure, this measure focused on the percentage of students taking and succeeding in English I and at least one college preparatory math course in the 9th grade. Successful completion was defined as passing the course with a grade of C or higher. While the first measure spoke to access, this second measure of successful course completion captured both access and success in school and did not penalize schools that were expanding access to more students. Students who dropped out were assumed to have not taken college prep courses after dropping out. The anticipated impact was at least 10 percentage points on both course-taking and course success by the second year of the intervention. It used the same sample as Outcome F.

Samples

The treatment sample for this study consisted of 18 participating schools in North Carolina that were recruited to participate in the project by North Carolina New Schools. Five treatment schools began their participation in the project in 2012-2013 and 13 schools began participating in the 2013-2014 school year. These schools were matched to 18 comparable non-participating schools.

All of the treatment and comparison schools were drawn from a list of schools that met the eligibility criteria of the U.S. Department of Education's Rural Low Income Schools (RLIS) Program. For potential comparison schools, we identified schools on the RLIS list that served students in grades 9-12. We removed from consideration any magnet or charter schools and any schools with which NC New Schools had previously worked. One high school started the project, but before any services had been received, a new principal took over and decided not to participate; this school was removed from consideration as a comparison school. Three schools were also on the original list for participation; however, before any services started, the superintendent decided to pull all three schools out of the project. Because the decision to stop the program was not made at the school level, we kept the schools in the pool. A total of 56 schools were included in the final pool of potential comparison schools.

The goal of the matching procedure was to identify a set of comparison schools that were comparable, at the group level, to the 18 treatment schools. Comparable at the group level meant that we sought a set of schools that, on average, did not critically differ from the treatment schools in terms of the outcome variable (assessed at baseline and aggregated to the school level), the school poverty rate, and the school minority rate at baseline with effect size differences of less than .25 standard deviations.

To match the schools, we developed an in-house procedure that embedded the baseline equivalence checks into the matching process. This procedure compared treatment schools to a randomly selected set of potential matches and either accepted or rejected the set based on the Hedge's *g* effect size criterion. In this way, the successfully matched schools constituted a group-wise match in that the full selected set of comparison schools had similar average school-level characteristics to the complete set of treatment schools. We were unable, however, to identify comparable schools for all outcomes simultaneously; as a result, we elected to find a unique set of comparison schools for each outcome. Thus, for each outcome of interest, the matched sample

of schools consisted of a set that differed from that of another outcome. Overall, 47 out of 56 available comparison schools were used, with fairly small overlap between both the outcomes and between cohorts (i.e., if a potential group school was in the Cohort I, Outcome X set, it was unlikely to reappear in either the Cohort II, Outcome X set, or Cohort I, Outcome Y set). It should be noted that there was one treatment school that could not be matched for Outcome A because, prior to the grant, it had already provided all of its students with access to a college success course. Tables 1a and 1b shows baseline equivalence for the samples analyzed for this paper; equivalence is presented for both the baseline measure of the outcome and the percent minority and percent poverty in the sample.

Table 1a: Baseline Equivalence Information, Outcomes A-C

Outcome	A: % 11th graders enrolled in college credit-bearing courses (Grade 11 only)			B: # of college credit-bearing courses completed by 12th grade (Grade 12 only)			C: Cohort Graduation Rate (Entire school)		
	Outcome (%)	Poverty (%)	Minority (%)	Outcome (#)	Poverty (%)	Minority (%)	Outcome (%)	Poverty (%)	Minority (%)
Control Mean	22.30	56.53	39.73	0.74	55.00	35.36	81.74	59.98	37.75
TX Mean	23.02	55.39	38.54	0.89	56.36	37.51	80.54	60.91	37.94
p value	0.86	0.75	0.89	0.53	0.75	0.80	0.65	0.80	0.98
Hedges *g*	-0.06	0.11	0.05	-0.21	-0.11	-0.08	0.15	-0.08	-0.01

Table 1b: Cohorts 1,2, and 3 Baseline Equivalence Information for Outcomes D-F

Outcome	D: Days Absent (Entire school)			E: Dropout Rate (Grades 10-12 only)			F: College Preparatory Success (Grade 9 only)		
	Outcome (%)	Poverty (%)	Minority (%)	Outcome (%)	Poverty (%)	Minority (%)	Outcome (%)	Poverty (%)	Minority (%)
Control Mean	9.48	58.45	38.08	2.80	57.75	37.28	74.82	67.65	38.28
TX Mean	9.63	60.91	37.94	2.88	58.58	37.53	72.66	66.83	39.01
p value	0.84	0.55	0.99	0.86	0.83	0.98	0.65	0.84	0.94
Hedges *g*	-0.06	-0.20	0.00	-0.06	-0.07	-0.01	0.15	0.06	-0.02

Note: Baseline treatment means for poverty and minority varied by outcome because the samples for the different outcomes were defined differently; for example, Outcome A used 11th grade students while Outcome B used 12th grade students.

All covariates were included in the impact analyses (see Table 2 in next section).

Analyses

Two statistical approaches were used to determine whether there was an impact from the RIS intervention. For all outcomes except graduation rate, we used hierarchical linear modeling (HLM) (Raudenbush & Bryk, 2002) to account for the fact that students were nested within schools. In general, all outcome models involved a fixed intervention effect at level 2, which was the primary effect of interest. This treatment effect was adjusted for several school level baseline measures (e.g., school enrollment, graduation rate, and school dropout rate) and six

common student- level covariates collected on the year for which impact was estimated. The student-level covariates were ELL status, 8th grade mathematics score, 8th grade reading score, disability status, minority status, and poverty status. All student-level covariates were grand mean centered (i.e., the overall proportion of status occurrence for the entire sample is subtracted from each level 1 case status), which may be used to reduce potential level 2 estimation problems due to multicollinearity (Hofman & Gavin, 1998; Kreft, de Leeuw, & Aiken, 1995).

The following model includes the general specifications for all outcomes that incorporated student-level data.

Level 1 (student level):

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

where:

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

COV_{pij} = grand-mean centered (GMC) p^{th} student-level covariate for student *i* in school *j*;

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

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

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):

$$\beta_{0j} = \gamma_{00} + \gamma_{01} T_j + \sum_{k=1}^{K} \gamma_{0(k+2)} X_j^k + u_{0j} \quad (2)$$

$$\beta_{pj} = \gamma_{p0} \quad (3)$$

where:

T_j = j^{th} school's intervention status: 1-treatment school, 0-matched comparison school;

X_j^k = k^{th} (k=1, 2,…, K) school-level baseline measure;

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

γ_{01} = overall fixed treatment effect adjusted for the baseline measures and the GMC student-level covariates;

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

u_{0j} = random effect of school *j*, assumed to be distributed with a mean of zero and variance of τ_{00}. Note that this term is also assumed to be independent of the student-level error term, e_{ij}.

This generic model was adapted to Outcomes A, B, and D-F, per specifications outlined in Table 2, and estimated using a two-tailed significance test at $p < .05$ significance level. The parameter γ_{01} is the parameter of interest. The γ_{01} effect was also tested for practical significance using Hedges *g*.

The impact on graduation rates was evaluated using multiple regression given that the outcome of interest variable was at level 2; the model was composed of school-level data (level 2) and included no student-level data at level 1. Specifically, the following regression model was specified at school level:

$$Y_j = \beta_0 + \beta_1 T_j + \beta_2 (BLGR) + \beta_3 (BLCSP) + \beta_4 (BLMin) + \beta_5 (BLPov) + e_j \quad (5)$$

where:

Y_j = impact year graduation rate for school *j*

β_0 = the expected mean graduation rate when all covariates are at 0

β_1 = overall effect of intervention status T_j, controlling for school-level covariates

β_2 = overall effect of baseline graduation rate, controlling for school-level covariates

β_3 = overall effect of baseline core subject passing rate, controlling for school-level covariates

β_4 = overall effect of baseline impact year school minority rate, controlling for school-level covariates

β_5 = overall effect of baseline impact year school poverty rate, controlling for school-level covariates

The effect size for the intervention status impact was estimated using both a Hedge's *g* and a squared semi-partial correlation, the latter of which corresponds to the unique contribution of the intervention status to the variation in impact year graduation rate. Table 2 includes the covariates that were incorporated in each model, by outcome.

Table 2: *Outcome-specific Covariates Included in Impact Estimation Models*

Outcome	Level-2 (Baseline)	Level-1
A: Proportion of students enrolled in at least one college-credit bearing course by end of 11th grade	Proportion of Students Enrolled in College Credit Bearing Course(s) by Grade 11	GMC Student Minority Status
	Minority Rate	GMC Student Poverty Status
	Graduation Rate	GMC Student ELL Status
	Poverty Rate	GMC Student 8th Grade Math Score
		GMC Student 8th Grade Reading Score
		GMC Student Disability Status
B: Average number of college credit bearing courses successfully completed by end of 12th grade	Average Number of College Credit Bearing Courses by Grade 12	GMC Student Minority Status
	Minority Rate	GMC Student Poverty Status
	Graduation Rate	GMC Student ELL Status
	Poverty Rate	GMC Student 8th Grade Math Score
		GMC Student 8th Grade Reading Score
		GMC Student Disability Status
C: Average proportion of students graduating high school	Graduation Rate	
	Minority Rate	
	Poverty Rate	
	Core Subject Passing Rate	

Outcome	Level-2 (Baseline)	Level-1
D: Days of absence	Average Absence Days	GMC Student Minority Status
	Minority Rate	GMC Student Poverty Status
	Graduation Rate	GMC Student ELL Status
	Poverty Rate	GMC Student 8th Grade Math Score
		GMC Student 8th Grade Reading Score
		GMC Student Disability Status
E: Proportion of students who dropped out of school	School Drop Out Rate	GMC Student Minority Status
	Minority Rate	GMC Student Poverty Status
	Poverty Rate	GMC Student ELL Status
		GMC Student 8th Grade Math Score
		GMC Student 8th Grade Reading Score
		GMC Student Disability Status
F: Proportion of students taking college preparatory courses in 9th grade	College Prep Enrollment Rate	GMC Student 8th Grade Math Score
	Minority Rate	GMC Student 8th Grade Reading Score
	Graduation Rate	GMC Student Minority Status
	Poverty Rate	GMC Student Poverty Status
	School Enrollment**	GMC Student ELL Status
		GMC Student Disability Status
G: Proportion of students succeeding in college preparatory courses in 9th grade	College Prep Passing Rate	GMC Student 8th Grade Math Score
	Minority Rate	GMC Student 8th Grade Reading Score
	Graduation Rate	GMC Student Minority Status
	Poverty Rate	GMC Student Poverty Status
	School Enrollment**	GMC Student ELL Status
		GMC Student Disability Status

Note. *Student variable indicators obtained from the baseline year; all other level 1 indicators obtained from the impact year data set. **Baseline school enrollment was included in impact analyses for outcomes F and G because it was a statistically significant factor (specifically, large schools in the comparison group followed the opposite trend as compared to the rest of the schools). School enrollment was not a significant variable in any of the exploratory analyses of other outcomes.

Results and Discussion

Results show that, after the first two years of implementation, a statistically significantly higher percentage of students in Rural Innovative Schools were taking college credit-bearing courses as compared to students in the comparison schools. Thirty-five percent of 11th graders in Rural Innovative High Schools had taken at least one college credit-bearing course compared to 26 percent of 11th graders in the comparison schools (a 9 percentage point impact, Hedges' *g*=.19). Students in Rural Innovative Schools had also successfully completed more college courses by the end of 12th grade (an average of 1.5 courses vs. .8 courses, Hedges *g*=.32). There were no statistically or practically significant impacts on college preparatory course taking or outcomes associated with remaining in school, including graduation rates, dropout rates, or absences. Table 3 presents the results for all outcomes.

Table 3: Impact Estimates, after two years of implementation

Outcome	Dependent Variable	Treatment Group			Comparison Group			Year 2	Hedge's *g*
		N	Adj. Mean	SD	N	Unadj. Mean	SD	Impact Estimate (SE)	
A	Proportion of students enrolled in at least one college-credit bearing course by end of 11th grade	2485	0.35	0.47	3452	0.26	0.44	0.09*(0.03)	0.19
B	Average number of college credit bearing courses successfully completed by end of 12th grade	2568	1.47	2.50	3158	0.79	1.80	0.68**(0.20)	0.32
C	Average proportion of students graduating high school	18	0.84	0.07	18	0.84	0.08	0.00(0.02)	-0.01
D	Average absences per student	10811	8.29	8.78	10892	8.36	8.94	-0.07(0.94)	-0.01
E	Proportion of students dropped out of school	8238	0.03	0.15	10836	0.03	0.16	0.00(0.00)	0.00
F	Proportion of students taking a college preparatory courses in 9th grade	3239	0.90	0.31	4153	0.89	0.32	0.02(0.02)	0.05
F	Proportion of students succeeding in college preparatory courses in 9th grade	3239	0.78	0.43	4153	0.75	0.43	0.03(0.03)	0.07

When considered from the perspective of the change literature, it does make sense that increases in college credits were the first impacts seen. Some researchers looking at school change have distinguished between "first order change" and "second order change" (Fouts, 2003). First order change, sometimes called "structural change" (Elmore, 1995) is when structures (such as class size) are changed. Second order change is when changes are in place that affect the relationships and interactions between individuals, such as changes in instruction (Fouts, 2003). Changing students' access to college courses could be considered a first order change while making the changes in instruction and relationships that are required to impact graduation rates would be regarded as a second order change. Structural changes are usually easier than other types of changes in schools, although they are often expected to lead to deeper changes in instruction or other areas (Elmore, 1995).

There is the possibility that expanding students' access to college credit-bearing courses will lead to additional changes in the school, such as improvements in instruction that will support better performance in college preparatory courses or increased student support that will help reduce dropout rates and increase graduation rates. These changes will depend on whether principals and their staff see college course taking as part of a broader school improvement effort or if it is considered an add-on, similar to traditional dual enrollment courses, that does not affect the core of the school.

In support of the implementation of early college principles, NC New Schools placed expanded access to college credit within the context of a broader school reform effort and asked schools to work toward changes in all of the six Design Principles. Case studies completed in six RIS schools suggested that changes were occurring around the College Ready Design Principle, including the expanded access to college courses and a more college-oriented school culture. The visited schools were also making changes in Professionalism, particularly through the introduction of instructional rounds during which teachers observed and provided feedback on each other's instruction. Changes in instructional practice (the Powerful Teaching and Learning Design Principle) were seen as occurring in pockets with individual teachers. Schools were starting to make changes in the Personalization Design Principle, such as increasing academic support and providing structures to enable teachers and students to get to know each other better. One case study principal noted that they really should have started with Personalization at the beginning instead of working on it in the third year. If changes in these other Design Principles take place, then it is possible that impacts on the other outcomes will be seen in the third or fourth year of implementation.

Conclusions

Results from this study suggest that comprehensive high schools may begin the implementation of early college strategies with increasing availability of college credit. This is not unexpected given that the college credit component is one of the unique aspects of the project and can be more easily implemented than other changes, such as changing instruction. So far, the results for comprehensive high schools are less positive than the results for the small early colleges of choice. This may also be expected as the small early colleges were started from scratch with very specific college-going cultures (Edmunds, 2012). It is possible that the changes in college credits

will ultimately lead to other changes in the comprehensive high schools; we will explore this with continued research.

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