What Works Clearinghouse™

ies INSTITUTE OF EDUCATION SCIENCES

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WWC Review of the Report "Early College, Early Success: Early College High School Initiative Impact Study"[1]

The findings from this review do not reflect the full body of research evidence on *Early College High Schools*.

What is this study about?

The study examined whether attending Early College High Schools improved high school and postsecondary outcomes for students. Early Colleges are high schools that partner with local colleges and universities to offer students the opportunity to take courses towards earning an Associate's degree or up to 2 years of college credit towards a Bachelor's degree. The authors evaluated the impact of Early Colleges on high school outcomes, such as academic achievement, GPA, and graduation. In addition, the study examined the impact of Early Colleges on college enrollment, placement in developmental education, college GPA, and college degree attainment. The authors also reported on high school graduation, college enrollment, and college degree attainment for various subgroups (females, racial/ethnic minorities, low income students, and first-generation college students).[2]

Using existing data collected and maintained by the schools, study authors identified ten Early Colleges in five states that (a) operated exclusively as Early College High Schools, (b) had graduates during the study years, and (c) employed and kept records of a lottery process to determine who would be offered admission to the program. A total of 2,458 students from 3 cohort years entered the identified lotteries. Students who were offered admission to Early College High Schools via the lottery formed the intervention group, while students not offered admission formed the comparison group.[3] The random assignment for this study was, therefore, not conducted by the study authors, but identified retrospectively from the participating schools' lottery records.

Features of Early College High Schools

Early Colleges provide students with exposure to, and support in, college while they are in high school. Early Colleges partner with colleges and universities to offer all students an opportunity to earn an Associate's degree or up to 2 years of college credits toward a Bachelor's degree during high school at no or low cost to the students.

Eight of the Early College High Schools in the study were typical 4-year high schools, and two Early Colleges had 5-year programs. Students had the opportunity to earn college credits or an Associate's degree while completing their high school courses of study.

Early Colleges are particularly interested in increasing college access and enrollment among students who are traditionally underrepresented in postsecondary institutions, including racial/ethnic minorities, students from low socioeconomic status families, or those whose parents did not attend college. The Early College High Schools in this study served student populations that were, on average, 49% racial/ethnic minorities and 44% low income.

What did the study find?

Study authors reported, and the WWC confirmed, that 86% of Early College students graduated from high school by the end of the study period, compared to 81% of comparison students, a statistically significant difference. The study also reported that students in Early Colleges had significantly better English/language arts achievement than students in comparison high schools; the WWC also confirmed this result. There were no significant differences between Early College High Schools and comparison high schools on mathematics achievement or high school GPA.

Postsecondary outcomes were collected through the end of the study period, with the cohorts followed for 2, 3, or 4 years after their expected graduation date from high school. Study authors reported that postsecondary enrollment through the end of the study period was 80% for the Early College students and 71% for the comparison students. Additionally, 22% of Early College students earned a postsecondary degree during the study period, compared to only 2% of comparison students. Early College students who enrolled in college were also less likely to be placed into developmental education than comparison students (18% vs. 22%). All of these differences were reported as being statistically significant, which the WWC confirmed.

Among students who were enrolled in college for at least one term, there were no significant differences between Early College and comparison students in college GPA.

The study reported high school graduation, college enrollment, and college degree attainment separately for males and females, racial/ethnic minorities and non-racial/ethnic minorities, and low income and non-low income students. The impact of Early Colleges on high school graduation and college enrollment was similar for males and females, for racial/ethnic minorities and non-racial/ethnic minorities, and for low income and non-low income students. However, the impact of Early Colleges on college degree attainment was significantly stronger for female students, racial/ethnic minorities, and low income students. These findings were confirmed by the WWC (for more information, see Appendix D).

WWC Rating

The research described in this report meets WWC evidence standards without reservations

This study is a well-executed randomized controlled trial. The impact estimates for high school achievement in mathematics and English/language arts, high school GPA, high school graduation, college enrollment, and college degree attainment meet WWC evidence standards without reservations.

The impact estimates for college GPA, placement in developmental education in college, and persistence in college for subsamples of students were evaluated by the WWC as quasi-experimental comparisons because they were derived from non-random subsets from the original randomized sample; therefore, they were required to demonstrate baseline equivalence. Program impacts on college GPA and placement in developmental education were estimated only for students who had enrolled in college. These outcomes meet WWC evidence standards with reservations. Program impacts on persistence in college were estimated only for students who enrolled in college; this outcome does not meet WWC evidence standards because baseline equivalence could not be established.

Appendix A: Study details

American Institutes for Research & SRI. (2013). *Early college, early success: Early College High School Initiative impact study*. Washington, DC: American Institutes for Research. Retrieved from http://www.air.org

Setting

The ten Early Colleges in the study were located in five states throughout the country: five in large urban areas, two in mid-sized cities, and three in small towns. Eight of the ten Early Colleges were located on college campuses. Seven had a 2-year public college partner, two had a 4-year public college partner, and one had both.

Study sample

The sample consisted of general education high school students. About half (52%) of the Early College group was female, vs. 55% of the comparison group. Racial/ethnic minority students comprised 52% and 54% of the intervention and comparison groups, respectively. In addition, 31% of the intervention group were first-generation college students, vs. 34% of the comparison group. Low income students comprised 47% of the intervention group, vs. 42% of the comparison group. None of these differences in group composition was statistically significant.

Intervention group

Six Early Colleges were district-run schools, and the remaining four were charter schools. Most of the schools had a particular academic focus in addition to being Early Colleges: five had a STEM focus, and two had a teacher preparation focus. The Early Colleges offered a number of supports, with all ten Early Colleges providing tutoring and college preparatory information. In addition, some of the Early Colleges offered regular advisory meetings with counselors; summer, evening, and weekend classes; extended school days; and/or block scheduling. In terms of the college coursework, seven Early Colleges had course sequences that allowed students to earn at least 2 years of college credit, two Early Colleges allowed students to earn up to 1 year of college credit, and one Early College had a course sequence that allowed students to earn at least some college credit.

Comparison group

The comparison students in the study attended 272 different high schools. The majority of the students who did not attend Early Colleges enrolled in larger high schools with larger racial/ethnic minority and low income student populations. Those schools provided fewer academic supports (e.g., tutoring) and a less direct focus on college readiness for all students. AP courses seemed to be more prevalent than dual enrollment as a strategy for students to earn college credit.

Outcomes and measurement

The study reported both high school and postsecondary outcomes. The eligible high school outcomes are: standardized English/language arts achievement, standardized mathematics achievement, high school GPA, and high school graduation. The eligible postsecondary outcomes are: any college enrollment, any postsecondary degree, placed in developmental education in college, and college GPA. The data for the high school graduation outcomes were obtained from high school records maintained by a variety of local sources. High school standardized achievement tests in English/language arts and mathematics were obtained from high school administrative records. High school GPAs were obtained from a student survey. The data for college enrollment and degree attainment outcomes were obtained from the National Student Clearinghouse (NSC). The NSC data provide conservative estimates of college enrollment and degree attainment. If a student did not have a record in the NSC, then that student was coded as not being in college. However, students may have been missing from the NSC because (a) they attended a college that did not provide data to NSC, (b) they did not allow NSC to share their individual record data, or (c) their name or birthday did not match the information in the NSC. Study authors stated that they had no reason to expect NSC data to be differentially missing for intervention and comparison students. The data for college GPA and developmental placement in college were obtained from a student survey. For a more detailed description of these outcome measures, see Appendix B.

Support for implementation

All but one of the Early Colleges had college instructors, rather than qualified high school instructors, teaching college courses.

Reason for review

This study was identified for review by the WWC by receiving significant media attention.

Appendix B: Outcome measures for each domain

High school degree attainment	
High school graduation	To measure high school graduation, study authors used high school administrative data. The source of the data differed by research site. In addition, study authors used data from multiple sources for some sites.
High school achievement in English/language arts	
Achievement in English/language arts	To measure achievement in English/language arts in high school, study authors used high school administrative data. The source of the data differed by research site. In addition, study authors used data from multiple sources for some sites. Scores were standardized test scores, typically from tenth grade, that were standardized using the state mean and standard deviation for each year and grade level.
High school achievement in mathematics	
Achievement in mathematics	To measure achievement in mathematics in high school, study authors used high school administrative data. The source of the data differed by research site. In addition, study authors used data from multiple sources for some sites. Scores were standardized test scores, typically from tenth grade, that were standardized using the state mean and standard deviation for each year and grade level.
High school GPA	
High school GPA	To measure high school GPA, study authors used information from a survey conducted with a sample of students who participated in the initial randomization. GPA was indexed using a 0–4 variable indicating students' self-reported high school grade point average.
College enrollment	
College enrollment	To measure enrollment, study authors used the National Student Clearinghouse (NSC) to determine whether or not students enrolled in college. The follow up period varied, with the three cohorts followed up to 2, 3, or 4 years post-high school. Study authors linked administrative data from the participating schools, districts, and states to the NSC postsecondary data. For study students who attended colleges that contributed to the NSC and allowed their records to be made available, data on college enrollments were obtained. Students not located in the NSC were assumed to not have enrolled in college.
College degree attainment	
College degree attainment	To measure degree attainment, study authors used the NSC to determine whether or not students earned any postsecondary credential, including certificates, Associate's degrees, or Bachelor's degrees. The follow up period varied, with the three cohorts followed up to 2, 3, or 4 years post-high school. Study authors linked administrative data from the participating schools, districts, and states to the NSC postsecondary data. For study students who attended colleges that contributed to the NSC and allowed their records to be made available, data on degree attainment were obtained. Students not located in the NSC were assumed to not have enrolled in college or attained a degree.
Developmental education	
Placement in developmental education	Among students who enrolled in college, a dichotomous indicator of whether a student enrolled in any developmental education in college was obtained from the student survey.
College GPA	
College GPA	Among students enrolled in college for at least one term, the student survey asked about college GPA. The variable used was a 0–4 indicator of college GPA after high school.

Table Notes: Thirteen other outcomes were examined in this study, but are not included in this report. College persistence was an eligible outcome under the protocol and was reported on a subsample of students who were initially randomized; the WWC considers these to be quasi-experimental comparisons, for which baseline equivalence must be established. Group equivalence was not established for the college persistence outcome. Therefore, persistence in college does not meet standards and is not included in this report. In addition, the following five outcomes were reported but are not eligible: enrollment in a 2-year college, enrollment in a 4-year college, attainment of certificate, attainment of Associate's degree, and attainment of Bachelor's degree. The review team determined that these five outcomes were not eligible because the authors dichotomized essentially ordinal variables in ways that combined positive outcomes with negative outcomes (e.g., for the Associate's degree attainment outcome, no degree attainment was combined with certificate and Bachelor's degree attainment for the comparison). In addition, the study also reported on student perceptions of academic difficulty in college, academic rigor in high school, instructional rigor in high school, and supportive resources in high school; these four outcomes are not eligible under the Postsecondary Education or single study review protocols. Finally, three outcomes were reported that the review team determined were overaligned with either the intervention or comparison conditions. These included: enrollment in college while in high school (the intervention is enrollment in college while in high school), college credit accumulation while in high school (overaligned with the intervention schools), and AP course taking in high school (highly aligned with comparison group participation).

Appendix C: Study findings for each domain

Domain and outcome measure	Study sample	Sample size	Mean (standard deviation) Intervention group	Mean (standard deviation) Comparison group	WWC calculations Mean difference	WWC calculations Effect size	WWC calculations Improvement index	*p*-value
High school degree attainment								
High school graduation	All students	2,458 students	86%	81%	5%	0.24	+9	< 0.05
Domain average for high school degree attainment						**0.24**	**+9**	**Statistically significant**
High school achievement in English/language arts								
Achievement in English/ language arts	All students	2,141 students	0.37	0.23	0.14	0.15	+6	< 0.05
Domain average for high school achievement in English/language arts						**0.15**	**+6**	**Statistically significant**
High school achievement in mathematics								
Achievement in mathematics	All students	1,628 students	0.28	0.23	0.05	0.06	+2	0.19
Domain average for high school achievement in mathematics						**0.06**	**+2**	**Not Statistically significant**
High school GPA								
High school GPA	All students	1,273 students	2.98	2.98	0	0.00	0	0.94
Domain average for high school GPA						**0.00**	**0**	**Not Statistically significant**
College enrollment								
College enrollment	All students	2,458 students	80%	71%	9%	0.30	+12	< 0.0001
Domain average for college enrollment						**0.30**	**+12**	**Statistically significant**
College degree attainment								
College degree attainment	All students	2,458 students	22%	2%	20%	1.63	+45	< 0.0001
Domain average for college degree attainment						**1.63**	**+45**	**Statistically significant**
Developmental education								
Placement in developmental education	Students enrolled in college	1,002 students	18%	22%	4%	0.14	+6	0.024
Domain average for developmental education						**0.14**	**+6**	**Statistically significant**

College GPA								
College GPA	Students enrolled for at least 1 college term	455 students	3.07	3.09	0.02	–0.02	–1	0.944
Domain average for college GPA						**–0.102**	**–1**	**Not Statistically significant**

Table Notes: For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on student outcomes, representing the average change expected for all students who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average student's percentile rank that can be expected if the student is given the intervention. The statistical significance of the study's domain average was determined by the WWC; the study is characterized as having a statistically significant positive effect because the effect reported is positive and statistically significant.

Study Notes: No corrections for clustering or multiple comparisons were needed. The *p*-values presented here were reported in the original study. The impact estimates reported in the table are derived from models that adjusted for clustering of students within lotteries and included the following covariates: female, racial/ethnic minority, first-generation, low income, prior achievement in English/language arts, and prior achievement in mathematics. Information on baseline equivalence for the developmental education and college GPA outcomes was obtained from the authors. All other information reported in the table was taken from the study report.

Appendix D: Supplemental findings by domain

Domain and outcome measure	Study sample	Sample size	Mean (standard deviation)		WWC calculations			*p*-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
High school degree attainment								
High school graduation	Female	1,264 students	85%	83%	2%	0.08	+3	0.15
High school graduation	Male	1,194 students	87%	78%	9%	0.40	+15	<0.001
High school degree attainment								
High school graduation	Racial/ethnic minorities	965 students	87%	82%	6%	0.26	+10	<0.001
High school graduation	Non-racial/ ethnic minorities	855 students	89%	83%	7%	0.33	+13	< 0.001
High school degree attainment								
High school graduation	Low income students	1,263 students	83%	74%	9%	0.32	+13	< 0.001
High school graduation	Non-low income students	1,125 students	89%	87%	2%	0.12	+5	0.051
College enrollment								
College enrollment	Female	1,264 students	81%	75%	6%	0.22	+9	< 0.001
College enrollment	Male	1,194 students	78%	66%	13%	0.39	+15	< 0.001
College enrollment								
College enrollment	Racial/ethnic minorities	965 students	80%	72%	8%	0.27	+11	< 0.001
College enrollment	Non-racial/ ethnic minorities	855 students	83%	73%	10%	0.37	+14	< 0.001
College enrollment								
College enrollment	Low income students	1,263 students	75%	64%	11%	0.31	+12	< 0.001
College enrollment	Non-low income students	1,125 students	85%	76%	9%	0.35	+14	< 0.001
College degree attainment								
College degree attainment	Female	1,264 students	23%	1%	22%	1.93	+47	< 0.001
College degree attainment	Male	1,194 students	22%	3%	19%	1.35	+41	< 0.001

College degree attainment								
College degree attainment	Racial/ethnic minorities	965 students	65%	1%	64%	3.23	+50	< 0.001
College degree attainment	Non-racial/ ethnic minorities	855 students	23%	3%	20%	1.41	+42	< 0.001
College degree attainment								
College degree attainment	Low income students	1,263 students	20%	1%	19%	2.07	+48	< 0.001
College degree attainment	Non-low income students	1,125 students	25%	3%	21%	1.35	+41	< 0.001

Table Notes: For mean difference, effect size, and improvement index values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on student outcomes, representing the average change expected for all students who are given the intervention (measured in standard deviations of the outcome measure). The improvement index is an alternate presentation of the effect size, reflecting the change in an average student's percentile rank that can be expected if the student is given the intervention.

Study Notes: No corrections for clustering or multiple comparisons were needed. The *p*-values presented here were computed by the WWC using the information reported in Exhibit E.5. The impact estimates reported in the table are derived from models that adjusted for clustering of students within lotteries and covariates. The models were run using ten multiple imputation datasets; WWC attrition standards were met using unimputed sample sizes provided by the authors. The sample sizes reported in the table are the means across the ten imputed datasets, rounded to the nearest whole number, and were provided by the authors. For high school graduation and college enrollment, the differences in impact estimates were not significantly different for males and females, racial/ethnic minorities and non-racial/ethnic minorities, or low income and non-low income students. The differences in impact estimates for college degree attainment were statistically significantly different for males and females, racial/ethnic minorities and non-racial/ethnic minorities, and low income and non-low income students. The study also reported on the impact of Early Colleges for first-generation college students vs. non-first-generation collge students. This subgroup analysis did not meet WWC standards; attrition for the subgroups was high, and sufficient information to establish baseline equivalence was not available.

Endnotes

[1] Single study reviews examine evidence published in a study (supplemented, if necessary, by information obtained directly from the author[s]) to assess whether the study design meets WWC evidence standards. The review reports the WWC's assessment of whether the study meets WWC evidence standards and summarizes the study findings following WWC conventions for reporting evidence on effectiveness. This study was reviewed using the Postsecondary Education topic area review protocol, version 2.0. A quick review of this study was released on August 2, 2013, and this report is the follow up review that replaces that initial assessment.

[2] Thirteen other outcomes were examined in this study, but are not included in this report. College persistence was an eligible outcome under the protocol and was reported on a subsample of students who were initially randomized; the WWC considers these to be quasi-experimental comparisons, for which baseline equivalence must be established. Group equivalence was not established for the college persistence outcome. Therefore, persistence in college does not meet standards and is not included in this report. In addition, the following five outcomes were reported but are not eligible: enrollment in a 2-year college, enrollment in a 4-year college, attainment of certificate, attainment of Associate's degree, and attainment of Bachelor's degree. The review team determined that these five outcomes were not eligible because the authors dichotomized essentially ordinal variables in ways that combined positive outcomes with negative outcomes (e.g., for the Associate's degree attainment outcome, no degree attainment was combined with certificate and Bachelor's degree attainment for the comparison). In addition, the study also reported on student perceptions of academic difficulty in college, academic rigor in high school, instructional rigor in high school, and supportive resources in high school; these four outcomes are not eligible under the Postsecondary Education or single study review protocols. Finally, three outcomes were reported that the review team determined were overaligned with either the intervention or comparison conditions. These included: enrollment in college while in high school (the intervention is enrollment in college while in high school), college credit accumulation while in high school (overaligned with the intervention schools), and AP course taking in high school (highly aligned with comparison group participation).

[3] This single study review reports results of an intent-to-treat analysis. Students who were offered admission into an Early College High School via winning a lottery formed the intervention group, regardless of whether they attended an Early College. Students who were not offered admission via a lottery formed the comparison group, regardless of where they attended high school. Across the ten study sites, 22% of the students offered admission to an Early College High School did not enroll; these students were included in the intervention condition. Two percent of the students who were not offered admission to an Early College High School actually enrolled in one; these students were included in the comparison condition. WWC standards require that reviews be based only on the intent-to-treat analyses because they preserve the benefits of random assignment and provide internally valid estimates of program impacts. The study authors report the results of the complier (or treatment-on-the-treated) analyses in Appendix G.

Recommended Citation

U.S. Department of Education, Institute of Education Sciences, What Works Clearinghouse. (2014, March). *WWC review of the report: Early college, early success: Early College High School Initiative impact study.* Retrieved from http://whatworks.ed.gov

Glossary of Terms

Attrition Attrition occurs when an outcome variable is not available for all participants initially assigned to the intervention and comparison groups. The WWC considers the total attrition rate and the difference in attrition rates across groups within a study.

Clustering adjustment If intervention assignment is made at a cluster level and the analysis is conducted at the student level, the WWC will adjust the statistical significance to account for this mismatch, if necessary.

Confounding factor A confounding factor is a component of a study that is completely aligned with one of the study conditions, making it impossible to separate how much of the observed effect was due to the intervention and how much was due to the factor.

Design The design of a study is the method by which intervention and comparison groups were assigned.

Domain A domain is a group of closely related outcomes.

Effect size The effect size is a measure of the magnitude of an effect. The WWC uses a standardized measure to facilitate comparisons across studies and outcomes.

Eligibility A study is eligible for review if it falls within the scope of the review protocol and uses either an experimental or matched comparison group design.

Equivalence A demonstration that the analysis sample groups are similar on observed characteristics defined in the review area protocol.

Improvement index Along a percentile distribution of students, the improvement index represents the gain or loss of the average student due to the intervention. As the average student starts at the 50th percentile, the measure ranges from –50 to +50.

Multiple comparison adjustment When a study includes multiple outcomes or comparison groups, the WWC will adjust the statistical significance to account for the multiple comparisons, if necessary.

Quasi-experimental design (QED) A quasi-experimental design (QED) is a research design in which subjects are assigned to intervention and comparison groups through a process that is not random.

Randomized controlled trial (RCT) A randomized controlled trial (RCT) is an experiment in which investigators randomly assign eligible participants into intervention and comparison groups.

Single-case design (SCD) A research approach in which an outcome variable is measured repeatedly within and across different conditions that are defined by the presence or absence of an intervention.

Standard deviation The standard deviation of a measure shows how much variation exists across observations in the sample. A low standard deviation indicates that the observations in the sample tend to be very close to the mean; a high standard deviation indicates that the observations in the sample are spread out over a large range of values.

Statistical significance Statistical significance is the probability that the difference between groups is a result of chance rather than a real difference between the groups. The WWC labels a finding statistically significant if the likelihood that the difference is due to chance is less than 5% ($p < 0.05$).

Substantively important A substantively important finding is one that has an effect size of 0.25 or greater, regardless of statistical significance.

Please see the WWC Procedures and Standards Handbook (version 2.1) for additional details.