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EARLY COLLEGE RESEARCH CENTER

THE ROLE OF COURSE MODALITY IN DUAL ENROLLMENT

INSIGHTS FROM NORTH CAROLINA

Julie Edmunds, Brian Phillips, Nina Arshavsky, Bryan Hutchins, Christine Mulhern

Overview

This brief summarizes key findings from a mixed-methods study examining the role of course delivery modality in dual enrollment (DE) in North Carolina. We looked at participation in, implementation of, and results for three different delivery modalities: 1) in person on the college campus; 2) online; and 3) in person at another location (usually the high school). We also looked separately at general education courses and at career and technical education (CTE) courses.

Overall, our results suggest that all three modalities are viable approaches for expanding access to dual enrollment and that decisions about delivery modality should be made based on context, capacity, and student needs. Key findings include:

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- In North Carolina, both DE coursetaking overall and the proportion of DE courses taken online grew substantially in recent years.
- Course delivery modality differed substantially by course subject, particularly for CTE dual enrollment courses, with hands-on courses more likely to be offered in person.
- Overall, course success rates were highest for courses taught at the high school/other locations. For general education courses, success rates were similar for courses taught online and on the college campus. For CTE dual enrollment courses, success rates were lowest for online courses.
- All three modalities had positive impacts on students' longer-term outcomes relative to similar students who did not participate, including the number of college credits earned in high school and attainment of postsecondary credentials.
- Each modality has its own advantages and challenges relative to implementation.

Background

Dual enrollment programs allow high school students to enroll in college courses while still in high school. These programs have grown substantially in North Carolina and across the U.S. in recent years. Nearly 2.8 million high school students nationally took at least one DE course from a college or university in 2023–24.[1]

Participation in dual enrollment is associated with a number of positive outcomes for students, including higher rates of graduating from high school, enrolling in and persisting in postsecondary education, earning a postsecondary degree, and higher early labor market earnings.[2] These findings are often stronger for those in groups traditionally underrepresented in postsecondary education, including students from low-income backgrounds, first-generation

college students, and students of color. [3] Given these positive outcomes, there is interest in expanding access to dual enrollment, which often requires the use of a variety of delivery modalities.

This brief focuses on three primary ways in which dual enrollment is delivered. First, students can take the courses on the college campus taught by college instructors. Second, students can take courses on the high school campus; these courses can be taught either by approved high school instructors or by college faculty. Third, students can take courses online; these courses are usually taught by college instructors.

A small set of studies has looked at different types of DE modality, connecting them to student outcomes. In general, these studies sought to determine which modality is better for students, with mixed results found across studies. Two studies found no differences by modality on high school and postsecondary outcomes.[4] One statewide study in Texas found that online students had the lowest course performance; however, online coursetaking was still associated with increased postsecondary enrollment.[5] A study of modality in Florida found the most positive benefits for students taking the courses on the college campus, followed by taking courses on the high school campus and then online.[6]

Methods

Our study took a somewhat different approach than most of the existing research. Instead of asking which modality is more effective, we started from the hypothesis that all three modalities could be used effectively to expand access to dual enrollment. We then looked at participation, outcomes and impacts, and implementation issues separately by modality.

The study used quantitative and qualitative analyses. The quantitative analyses used a statewide student-level administrative dataset that connects data from the K-12 system with data from the NC Community College System that included the location of the dual enrollment course and whether it was taught online or in person. [7] We also linked these data to National Student Clearinghouse data to capture postsecondary enrollments and credentials earned. We conducted descriptive analyses of participation and course outcomes, for both general education and CTE dual enrollment courses. These analyses were done at the course level.

To look at the longer-term impact of taking dual enrollment in a specific modality, we compared students taking the majority of their courses in a specific modality (e.g., online, on the college campus, at the high school/other location) with students not taking any dual enrollment courses. We excluded from the impact analysis students not taking a majority of their courses in a specific modality (e.g., who took one course in each modality), because our goal was to understand what makes each modality distinct; fewer than 10 percent of the dual enrollment students fell in this group. We used propensity score weighting to balance dual enrollment students and the comparison group on observed covariates. The impact analyses were done separately by students' DE pathway (see description below). In total, the impact analyses

included about 628,000 students across seven cohorts entering 11th grade from 2014–15 through 2020–21—nearly 137,000 dual enrollment students and more than 491,000 comparison students.

The qualitative data provided insights about implementation and student and staff perspectives about the different modalities. We conducted interviews with 48 district coordinators, high school principals, counselors, teachers, college liaisons, and Institutions of Higher Education (IHE) program directors from eight school districts and their partner colleges across diverse regions of North Carolina. Additionally, we conducted in-person focus groups with students enrolled in dual enrollment courses in four districts.

North Carolina Context

To provide context for the findings below, we highlight some of the most important aspects of dual enrollment implementation in North Carolina. The state's dual enrollment program consists of three pathways: 1) the College Transfer Pathway, which provides students with access to general education DE courses that can lead to an associate degree and transfer to a four-year institution; 2) the Career and Technical Education (CTE) dual enrollment pathway, which allows students to take career-focused DE courses that can lead to a technical credential or a workforce-focused major; and 3) Cooperative Innovative High Schools, or early colleges, small schools often located on college campuses that provide intensive DE experiences. Our modality analyses focus on the first two pathways, which are implemented in traditional high schools; we exclude Cooperative Innovative High School students from the analyses since that is a very different, more intensive model.

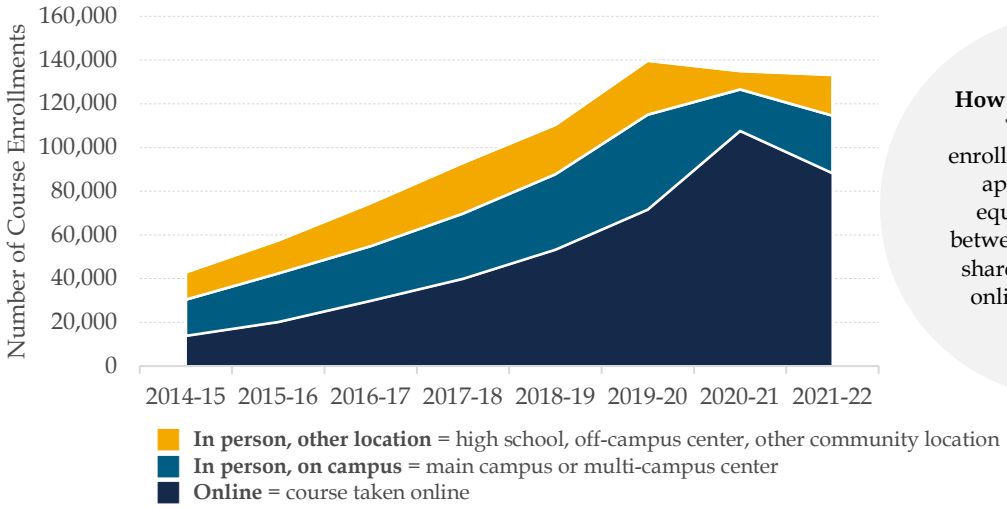
Dual enrollment courses for the College Transfer and CTE Pathways are offered only by community colleges. Students pay no tuition, although they may have to pay for fees and textbooks depending on the district. The vast majority of courses are taught by college faculty, which is different than most states where qualified high school teachers teach college courses on the high school campus; this likely contributes to why North Carolina has higher online dual enrollment than many states. As a result, North Carolina is a good state to examine the efficacy of online dual enrollment in particular.

Student Participation in Different Dual Enrollment Delivery Modalities

We looked at participation in different modalities at the course level. Figure 1 shows two trends in North Carolina over time:

- DE coursetaking overall grew substantially, from about 40,000 course enrollments in 2014–15 to between 130,000 and 140,000 in 2021–22.
- The proportion of DE courses taken online increased from one-third in 2014–15 to one-half just prior to the pandemic in 2019–20 to two-thirds in 2021–22.

FIGURE 1. NUMBER OF DUAL ENROLLMENT COURSE ENROLLMENTS, MODALITY, 2014–2022



How to read this chart: The total # of enrollments in 2014-15 is app. 42,000, about equally distributed between modalities. The share of courses taken online has increased over time.

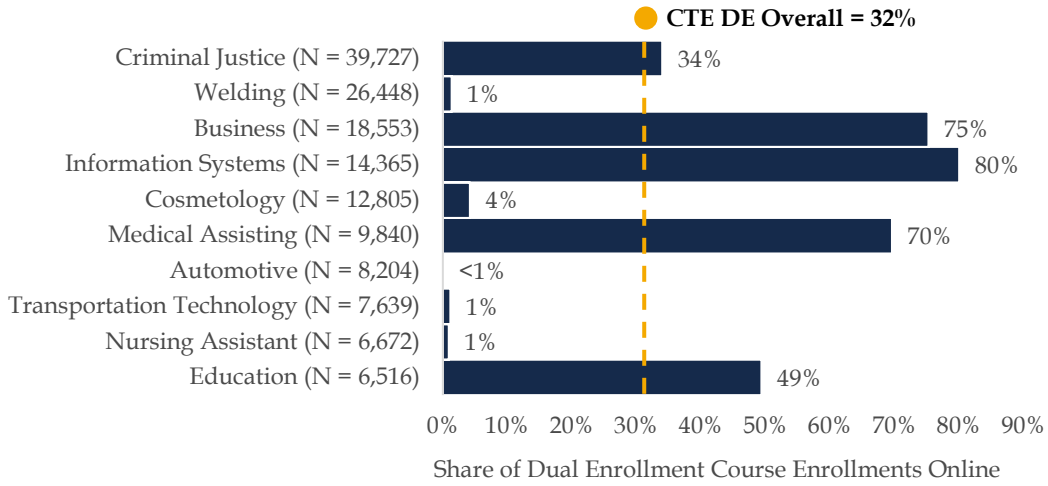
Table 1 shows different patterns in course modality by course type. General education courses were more likely to be taken online, while CTE courses were about equally distributed across the three modalities.

TABLE 1. CTE AND GENERAL EDUCATION DUAL ENROLLMENT COURSES, BY MODALITY, 2014–2022

Course Type	College Campus	Online	High School/ Other location
Overall	28%	54%	18%
General Education	25%	62%	13%
CTE	35%	32%	33%

CTE DE courses with a more hands-on component were much more likely to be taken in person while other CTE courses, such as business or information systems, were much more likely to be taken online (Figure 2).

FIGURE 2. SHARE OF CTE DE COURSES TAKEN ONLINE, BY COURSE SUBJECT, 2014–2022



Note: These analyses were done at the course level. The chart displays the top ten CTE DE course subject areas by courses taken over the study period.

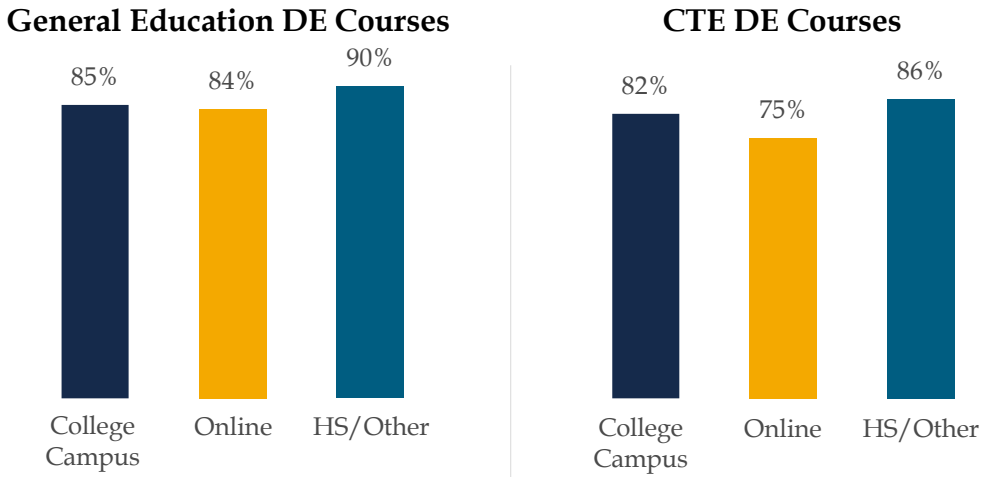
Interviews provided additional insights into why and how courses were offered through different modalities. More than half of the districts reported that course modality was primarily determined by the community college, though district needs were often taken into account. In half of the eight high schools in our study, online classes were required to be taken in a designated learning lab on the high school campus, supervised by a facilitator who offered technical support and monitored student progress. In other schools, students could choose to take online courses either at school or at home. Dual enrollment students taking courses online or on college campuses were typically enrolled alongside the general college population. On high school campuses, dual enrollment classes were composed exclusively of dual enrollment students. In a few limited cases, however, college-campus dual enrollment courses also included only dual enrollment students; we saw no examples where online courses were only high school students.

Students expressed mixed preferences for online versus in-person classes, often shaped by their own and their peers' experiences. Some favored online courses for their flexibility and self-paced structure, while others felt that the greater structure and guidance of in-person instruction better supported their success. In some cases, students had no choice in course modality, as certain classes were available only online.

Outcomes in and Impacts from Dual Enrollment Courses by Modality Type

Course success rates were highest for courses taught at the high school/other locations. For general education courses, success rates were similar for courses taught online and on the college campus. For CTE dual enrollment courses, success rates were lowest for online courses (Figure 3), although they have improved over time.

FIGURE 3. SUCCESS RATE BY MODALITY AND TYPE OF COURSE, 2014–2022



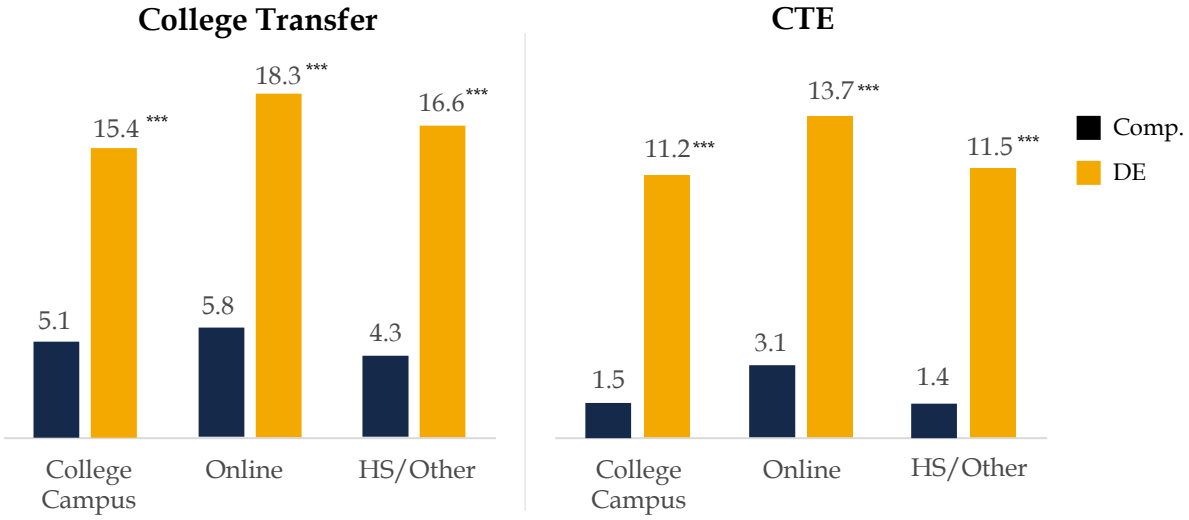
Note: These analyses were done at the course level. Success was defined by earning a C or higher in the course.

Some of these patterns were supported by the interviews, with staff in three-quarters of the districts agreeing that students are generally more successful in in-person courses than in online ones. As one Distance Learning Facilitator put it, "Honestly, face-to-face is hands down the best. The kids can be in the classroom where they become more comfortable with the instructor. Online, it's probably the least effective." However, staff generally perceived that students were doing worse in online courses than the success rates in the quantitative data indicated (particularly for the general education courses).

Staff did recognize that some students could be successful in the online environment. As one college liaison shared, "Some students do really well in an online environment, and some students really need that hands-on accountability… It obviously takes a disciplined student to do the online coursework, but I think certain students do really well in those courses."

Looking at longer-term impacts shows a somewhat different picture than looking only at the course outcomes. For these analyses, we placed students in mutually exclusive groups based on the modality of the majority of DE courses they took; we then analyzed the students separately by the pathway in which they were enrolled (College Transfer vs. CTE). Our impact analyses show that all three modalities had positive impacts on longer-term outcomes with some of the highest impacts for students who took most of their DE courses online. Looking at the number of college credits earned, we see positive impacts for all modalities, with students who take the majority of their courses online earning the most credits (Figure 4).

FIGURE 4. COLLEGE CREDITS EARNED FOR DE AND COMPARISON STUDENTS, BY MODALITY AND PATHWAY



Note: Students were placed in mutually exclusive groups based on where they took the majority of their courses, e.g., online includes students who took the majority of their courses online. College credits were those earned in high school and could have been earned by passing a DE course or by passing an AP exam.
***Statistically significant at p≤.001.

Table 2 shows the differences in postsecondary outcomes between the treatment and comparison groups for each modality for students participating in the general education-

focused College Transfer pathway. The numbers are the impact estimates (difference between treatment and comparison groups). A dark blue upwards arrow indicates that the impacts were positive and statistically significant. A slightly lighter arrow indicates that the results were marginally significant. As the table shows, all three modalities had positive impacts on postsecondary enrollment and credential attainment.

TABLE 2. IMPACTS ON POSTSECONDARY ENROLLMENT AND CREDENTIAL ATTAINMENT FOR COLLEGE TRANSFER PATHWAY PARTICIPANTS, BY MODALITY

	College Campus[a]	Online[a]	HS/Other[a]
Enrollment in any postsecondary institution	↑ +8.6pp***	↑ +9.3pp***	↑ +8.9pp***
Earning any postsecondary credential (by 6 years post 12th grade)	↑ +6.7pp***	↑ +8.2pp***	↑ 5.3pp***
Earning postsecondary certificate (by 3 years post 12th grade)	↑ +3.1pp***	↑ +2.0pp***	↑ +4.0pp***
Earning associate degree (by 3 years post 12th grade)	↑ +6.6pp***	↑ +7.0pp***	↑ +4.1pp***
Earning bachelor's (by 6 years post 12th grade)	↑ +3.4pp***	↑ +6.2pp***	↗ +3.5pp[t]

[a] Students were placed in mutually exclusive groups based on where they took the majority of their courses, e.g., online includes students who took the majority of their courses online. The sample for each outcome includes the total number of students present at each point in time.
[t] Statistically significant at p≤.10. ***Statistically significant at p≤.001.

Table 3 shows results for the impact of participation in the CTE dual enrollment pathway. Across all three modalities, there were positive impacts on all outcomes with the exception of earning a bachelor's degree. The statistically significant negative impact (shown by the downward facing yellow arrow) or null impact on bachelor's degree attainment for the two in-person modality groups—majority of DE courses on the college campus and majority at the high school/other location—were driven primarily by the fact that those modalities have more hands-on courses that are not intended to lead to bachelor's degrees. Relatedly, both of these modalities had very large impacts on earning a technical credential. In contrast, students in the CTE DE Pathway who took the majority of their DE courses online were much more likely to be taking DE courses that are intended to transfer to a four-year institution, which likely contributed to the positive impact on bachelor's degree attainment.

TABLE 3. IMPACTS ON POSTSECONDARY ENROLLMENT AND CREDENTIAL ATTAINMENT FOR CTE DUAL ENROLLMENT PATHWAY PARTICIPANTS, BY MODALITY

	College Campus[a]	Online[a]	HS/Other[a]
Enrollment in any postsecondary institution	+7.1pp***	+11.1pp***	+4.4pp***
Earning any postsecondary credential (by 6 years post 12th grade)	+10.9pp***	+6.9pp***	11.5pp***
Earning postsecondary certificate (by 3 years post 12th grade)	+17.3pp***	+5.5pp***	+15.7pp***
Earning associate degree (by 3 years post 12th grade)	+5.0pp***	+6.0pp***	3.2pp***
Earning bachelor's (by 6 years post 12th grade)	-2.0pp**	+2.4pp**	-0.8pp

[a] Students were placed in mutually exclusive groups based on where they took the majority of their courses, e.g., online includes students who took the majority of their courses online. The sample includes the maximum number of students present at each point in time.
**Statistically significant at p≤.01; ***Statistically significant at p≤.001.

Advantages and Disadvantages by Modality

As the impact results show, it is better to take dual enrollment in any of the three modalities than not to take dual enrollment at all. As a result, districts and colleges should consider all three modalities as appropriate tools in their toolbox. However, each modality has advantages and disadvantages that need to be considered.

ON THE COLLEGE CAMPUS

Offering students courses on the college campus provides students with the experience that most closely mirrors the actual college experience; as a result, some researchers see this as providing the highest quality and most authentic preparation.[8] However, there are many challenges associated with this model including ensuring that students have transportation to get to the college and that high school and college schedules are coordinated. Additionally, some districts have policies restricting when students leave the high school campus, which can limit students' participation in courses offered on a college campus.

The colleges and districts we interviewed developed a range of practices to address these challenges. Half of the districts aligned their schedules with the community college to increase opportunities for students to enroll in dual enrollment classes. Three community colleges strategically scheduled popular CTE and general education courses in back-to-back time blocks on their campuses, allowing students to attend multiple courses in one trip with dual enrollment students given priority registration for these courses. One urban district provided transportation from all 10 of its high schools to facilitate student participation during these scheduled periods.

ONLINE

Online courses, which are taught by college faculty, can provide access to the college experience without being affected by barriers such as scheduling and transportation. Asynchronous online classes, in particular, are much easier to fit into student schedules, since they don't require meeting at specific times. Online coursetaking can be particularly important in rural districts, where local colleges may be far away; however, internet availability can pose challenges in these areas. We found the highest rates of online DE coursetaking in rural areas with high internet access and the lowest rates in rural areas with low internet access, with online coursetaking in urban areas in between. Additionally, as our data show and as interviewees reported, many students struggled with online coursetaking, particularly in subject areas such as math. One district observed that when all courses moved online during COVID-19, both student motivation and success declined, and the withdrawal rate increased by about 10%.

To help students be more successful in online courses, interviewees reported using structured support strategies for online learners at the high school. Many districts provided a dedicated Distance Learning Coordinator who supervised students taking online courses during the school day. These coordinators monitored student progress, provided technical assistance, encouraged use of available resources, and acted as a bridge between students and instructors.

One college liaison described the importance of having a dedicated space for students to take the courses that was staffed by such a coordinator.

> *I think that designated classroom with a Distance Learning Advisor is huge. I know that the advisors that work in my schools are just critical resources for students. They encourage them to write properly to their instructor, if they don't understand. They encourage them to ask questions or to reach out to me if they don't know. Students are just real comfortable usually with high school personnel. And I think having that person there as a resource is really important. And I see that being very successful.*

Both teachers and students reported becoming more comfortable with online learning over time. As one teacher shared, "Compared to the first year that I did [dual enrollment], I don't have as many students saying, 'Oh, I have to have face-to-face,' or something like that. They're like, 'Oh, I want to take it online.' They seem to like that format and the convenience of that format, as opposed to having to travel to campus."

AT THE HIGH SCHOOL/ANOTHER LOCATION

Staff in half of the districts noted that dual enrollment courses taught on high school campuses by high school teachers or community college faculty offered the best option for supporting student success and reducing barriers to access. The selection of courses taught by college instructors on high school campuses depended on student demand, faculty availability, and classroom space. For courses taught by college faculty, which is frequently the case in North Carolina, the class must have a minimum number of students. For classes taught by high school instructors, these individuals must meet the qualifications set by the college's accrediting body, which entail additional credentials above those required to teach high school.

Conclusion

Overall, our results indicate that all three primary course delivery modalities can be used effectively to expand access to dual enrollment. Each modality has associated benefits and challenges that colleges and districts will need to consider as they seek to implement them most effectively.

A final note: our findings highlight the different conclusions that would be made around online dual enrollment coursetaking if we looked just at the course success rates or if we looked only at the long-term impacts. This suggests that policymakers and practitioners should consider both short and long-term impacts when making decisions about the efficacy of programs.

> Having those various methods of delivery – I think it's critical to the success and student participation. Students have such varied needs now in terms of their time, their schedules, and their work outside of school, that having those various methods of delivery, I don't think you can overstate its importance.
>
> - College Liaison

Footnotes

[1] Fink, J. (2025) The CCRC Blog: High school dual enrollment grows to 2.8 million. https://ccrc.tc.columbia.edu/easyblog/high-school-dual-enrollment-grows.html

[2] An, B. P., & Taylor, J. L. (2019). A review of empirical studies on dual enrollment: Assessing educational outcomes. Higher Education: Handbook of Theory and Research: Volume 34, 99–151; Schaller, T. K., Routon, P. W., Partridge, M. A., & Berry, R. (2025). A systematic review and meta-analysis of dual enrollment research. Journal of College Student Retention: Research, Theory & Practice, 27(1), 263–289.

[3] Henneberger, A. K., Witzen, H., & Preston, A. M. (2020). A Longitudinal Study Examining Dual Enrollment as a Strategy for Easing the Transition to College and Career for Emerging Adults. *Emerging Adulthood*, *10*(1), 225–236.

[4] Clayton, G., Faria, A., & Witowsky, P. (2025). Concurrent enrollment outcomes by course location. *Community College Journal of Research and Practice, 49*(3), 153–168; Hu, X., & Chan, H.-Y. (2021). Does delivery location matter? A national study of the impact of dual enrollment on college readiness and early academic momentum. *Teachers College Record, 123*(4), 1–32.

[5] Ryu, W., Schudde, L., & Pack-Cosme, K. (2024). Dually noted: Examining the implications of dual enrollment course structure for students' courses and college enrollment outcomes. *American Educational Research Journal, 61*(4), 803–841. doi:10.3102/00028312241257453

[6] Liu, V. Y. T., Minaya, V., Zhang, Q., & Xu, D. (2020). *High school dual enrollment in Florida: Effects on college outcomes by race/ethnicity and course modality*. Retrieved from New York NY: https://ccrc.tc.columbia.edu/media/k2/attachments/dual-enrollment-florida-race-ethnicity-course-modality.pdf

[7] Courses can also be identified as hybrid, which we grouped here with in-person courses following the guidance of our partners at the NC Community College System.

[8] An & Taylor, 2019; Karp, M. M. (2012). "I don't know, I've never been to college!" Dual enrollment as a college readiness strategy. *New Directions for Community Colleges, 2015*, 59–70.

More about this study: The research reported here was done through a partnership between the Early College Research Center and RAND and was supported by a grant from the Institute of Education Sciences, U.S. Department of Education (R305H190036), awarded to the University of North Carolina at Greensboro and by a grant from the Dual Enrollment Research Fund, managed by the Rodel Foundation. The views expressed here are of the authors and do not reflect those of the Institute of Education Sciences, the U.S. Department of Education, or the Rodel Foundation.

For more information about the Dual Enrollment Course Modality Study, please contact Julie Edmunds at jedmunds@serve.org. To learn more about the Early College Research Center and for more resources about Early College, see EarlyCollegeResearch.uncg.edu.