Vol. 20 Issue 7
November 2023

Office for Education Policy

Advanced Placement (AP) & Concurrent Enrollment (CE) Courses and College Outcomes

Summary Points

- **Enrollment in AP & CE was related to students' demographic characteristics.**
- **Higher roles of college enrollment especially in in-state and 4-year institutions is associated to AP & CE enrollment. Enrollment in AP is also associated with a higher likelihood of majoring in STEM in college.**
- **Only AP course enrollment was associated with a higher likelihood of students enrolling in highly selective colleges across the country.**
- **Results varied across student demographic and programmatic categories.**

This Brief

For 20 years, Arkansas school districts have been required to provide access to advanced coursework through Advanced Placement (AP) and Concurrent Enrollment (CE) courses. Despite universal access, we find that enrollment in AP or CE courses still varies across students' demographic groups. However, the findings also highlight improved postsecondary outcomes for several student groups.

Introduction

AP and dual or CE courses provide high school students with an opportunity to take rigorous coursework in multiple subject areas. The general goal of AP courses is to introduce learners to college-level learning opportunities that support student college readiness. AP and CE courses are recognized for the potential to enhance students' academic outcomes including postsecondary outcomes such as college enrollment and on-time graduation as well as majoring in STEM (Jones, 2014).

Although AP and CE courses can be beneficial, these interventions, like many others, receive criticism regarding issues of equity and inclusion (Klopfenstein, 2004; Ricciardi & Winsler, 2021). According to Ebrahiminejad and colleagues (2021), AP courses favor mostly white and affluent students compared to rural, low income, students of color, English language learners (ELL), and females.

According to Arkansas Code (005.22.04 Ark. Code R. § 002), all school districts are required to offer at least one AP course in math, science, English, and social studies (McKenzie & Ritter, 2005, 2016). Act 102 of 2003 increased AP and CE enrollment of students from traditionally underrepresented and underserved populations. Additionally, the state covers the entire AP test cost for home-schooled and public-school students enrolled in an AP course.

The present study seeks to understand the impact of universal AP programs and dual enrollment or CE courses in Arkansas, particularly in relation to equity and post-secondary outcomes.

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Study Design

Our study seeks to answer the following questions:

1) What are the demographics and factors associated with enrollment in AP and CE high school courses?
2) How does enrollment in AP or CE courses associate with post-secondary enrollment, major and type of institution students choose?
3) Are there any heterogeneous effects across groups on postsecondary enrollment, college selectivity, and types of postsecondary institutions attended?

Sample

We utilized data from the Arkansas Department of Education (ADE), the National Student Clearinghouse (NSC), and the U.S. Census. All data sources were restricted to high school students (grade 9-12) in 2014-2019, where data was systematically available. Merging all these data sources resulted in a relatively comprehensive student-level database including student demographics, achievement, high school courses, and postsecondary outcomes. We obtained over 900,000 observations in our complete dataset. Tables 1 & 2 provide information about our analytical sample of Arkansas students.

The analytic sample mirrors the characteristics of Arkansas public school students. As presented in Table 1, about 7% of students were identified as ELLs from 2014 to 2019 (equally males and females). Most students (56%) were participating the the FRL status. About 12% were G/T and 10% were multilingual. Most students were white (63%), with 21% Black, 11% Hispanic, 2% Asian, 2% more than one race, and 1% Native American/Native Hawaiian or Pacific Islander. The majority of students (57%) About 57% attended school districts in urban areas.

Student course-taking outcomes are presented in Table 2. At some point in grades 9 through 12, 30% of students took AP courses at least once, and 3% took four or more AP courses. By AP

Table 1: *Student demographic statistics (2014-2019)*

Variable	n	%
Educational characterization		
ELL status	67,631	7
Female	483,080	50
Free or Reduced Lunch (FRL) status	541,050	56
Gifted and Talented (G/T) status	98,343	12
Multilingual students	96,616	10
Race and Ethnicity		
Asian	19,323	2
Black	202,893	21
Hispanic	106,278	11
White	608,681	63
More than one race	19,325	2
Other	9,661	1
School district urbanicity		
Rural	415,449	43
Urban	550,712	57
Total observations (N)	966,161	

Table 2: *Descriptive statistics of explanatory variables (2014-2019)*

Variable	n	%
AP		
At least take 1	289,848	30
Take 4 or more (top 1% takers)	28,980	3
AP pSTEM	28,988	3
CE		
At least take 1	231,878	24
Take 5 or more (top 1% takers)	19,320	2
CE pSTEM	28,905	3
Simultaneous AP and CE courses		
Took both at least 1 AP & CE	96,617	10
Took either at least 1 AP or 1 CE	328,494	34
Took no AP or CE courses at all	579,700	60
Took both at least 1 pSTEM	28,848	3
Total observations (N)	966,161	

course type, 3% of all Arkansas students from 2014-2019 took at least one pSTEM AP course. In this study, we define pSTEM as any course under physical and life sciences, technology, engineering and mathematics disciplines and excluding social science disciplines due to missing data. About 24% of students took CE or dual enrollment courses and earned college credits. Two percent of high school students took five or more CE courses. Three percent took at least one STEM CE course. As seen in Table 3, the enrollment rates of AP and CE varied across groups with female, non-FRL, urban, and white students having higher participation rates.

Methodology

We employed both logit and multinomial logit models for our analyses. Logit models are commonly used to predict probability of binary outcomes (whether student took AP or not, took CE or not, enrolled in college or not, major in STEM or not etc) and multinomial logit used the same approach to predict the probability of categorical outcomes that have more than two options such postsecondary enrollment types (do not go to college, enrolled in 4-year institution, enrolled in 2-year institution) or selective colleges categories (most competitive college, highly competitive college, competitive college, not competitive college). While controlling for students' demographic characteristics and past achievement, these two models will provide us with probability of the outcomes in this analyses: enrollment to AP, AC, any postsecondary and selective colleges. Details about this model can be seen in the similar report (Djita et al., 2023).

Results

Research Question 1 (RQ1)

From figures **1A and 1B**, we found enrollment in AP or CE was associated with students' demographic and programmatic characteristics. Despite Arkansas' universal policy requiring school districts to provide access for students with AP and CE courses, we show that some minoritized students such as FRL and ELL students consistently have lower likelihoods of enroll in AP and CE courses compared to high income and non-ELL students. Certain groups of students such as, female, Asian, and G/T students. Black, Hispanic and multiracial students tended to have higher likelihoods of enrolling in AP courses than white students, but the trend is the opposite for CE courses. It is beyond the scope of this study to explore the reason as to why this policy worked for some student groups and did not work for others. It is possible that this lower participation among ELLs and FRL might be influenced by some other contextual factors such as type of AP and CE offered, teacher preparation, level of guidance and support that worth exploring by future studies. It is clear that providing access only may not be enough to increase enrollment for all minoritized students.

Research Question 2 (RQ2)

We provide results for RQ2 in **Table 3.** Enrolling in at least one AP course in high school is associated with higher likelihoods to enroll in 4-year institution by 21 pp, in-state institution by 17 pp, out-of state institution by 4 pp, top schools across the country by about 11 pp. Enrolling in at least one CE course is associated only with higher likelihoods to enroll in 4-year institution by 22 pp and in-state institution by 21 pp. These results show that enrolling in AP & CE are associated with higher college enrollment.

This situation is understandable because the rigorous curriculum in AP & CE may help students to hone their higher-order and critical-thinking skills that are essential for college success. In addition, students are incentivized to take advanced courses to help reduce the number of college years and higher education cost, which is another reason for them to pursue higher education after high school.

Table 3: AP & CE courses and postsecondary outcomes (N=219,115)

	(1) 4-year	(2) 2-year	(3) In-state	(4) Out-of -state	(5) Top schools	(6) pSTEM
At least 1 AP	0.21***	-0.01	0.17***	0.04***	0.11***	0.07***
	(0.01)	(0.01)	(0.01)	(0.00)	(0.02)	(0.01)
At least 1 CE	0.22***	-0.00	0.21***	0.01*	-0.00	0.01
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)

*We controlled for demographic characteristics and students' past achievement. All models include district fixed effects. pSTEM (physical science, technology, engineering and math) based on Ceci et al., 2014. Details for each Pseudo R2 for each model can be seen in Djita et al. (2023). Standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05.*

Figure 1A: Likelihood of Enrolling in AP & CE Courses by Demographic and Programatic Characteristics

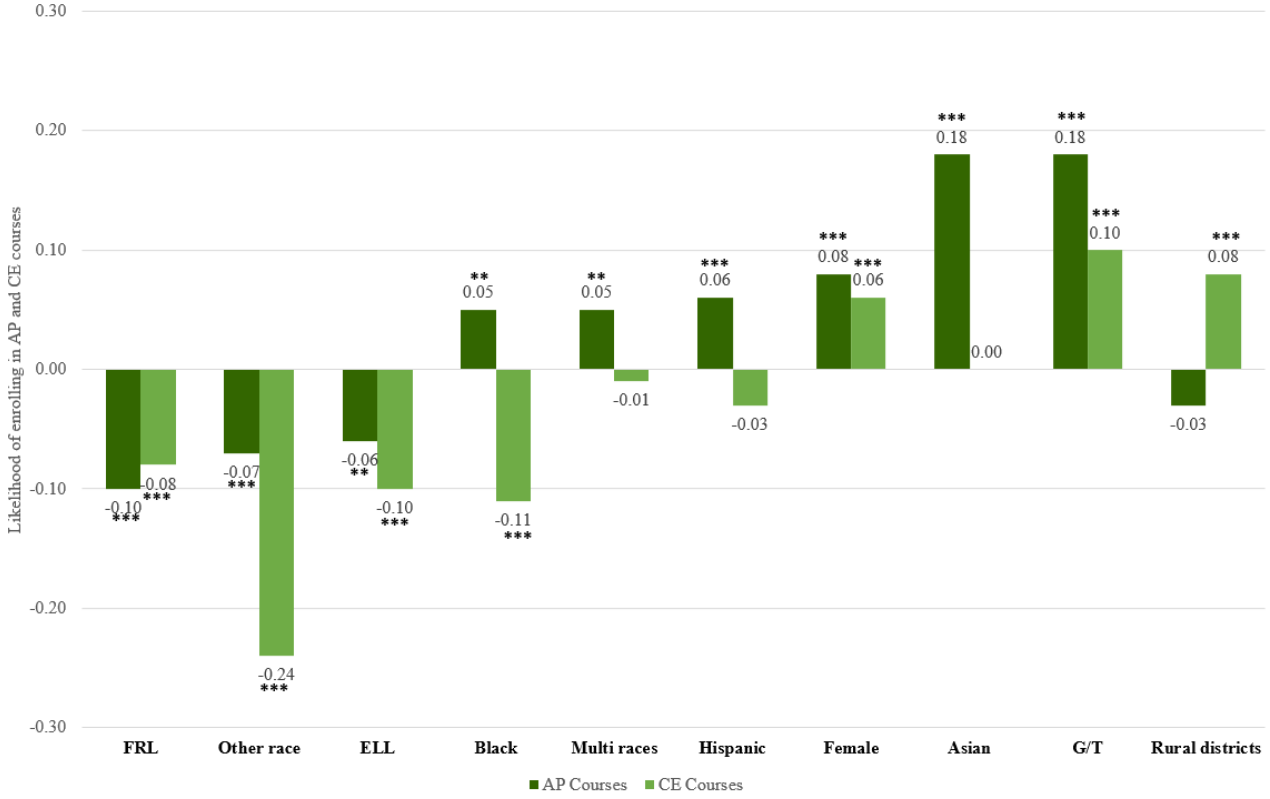
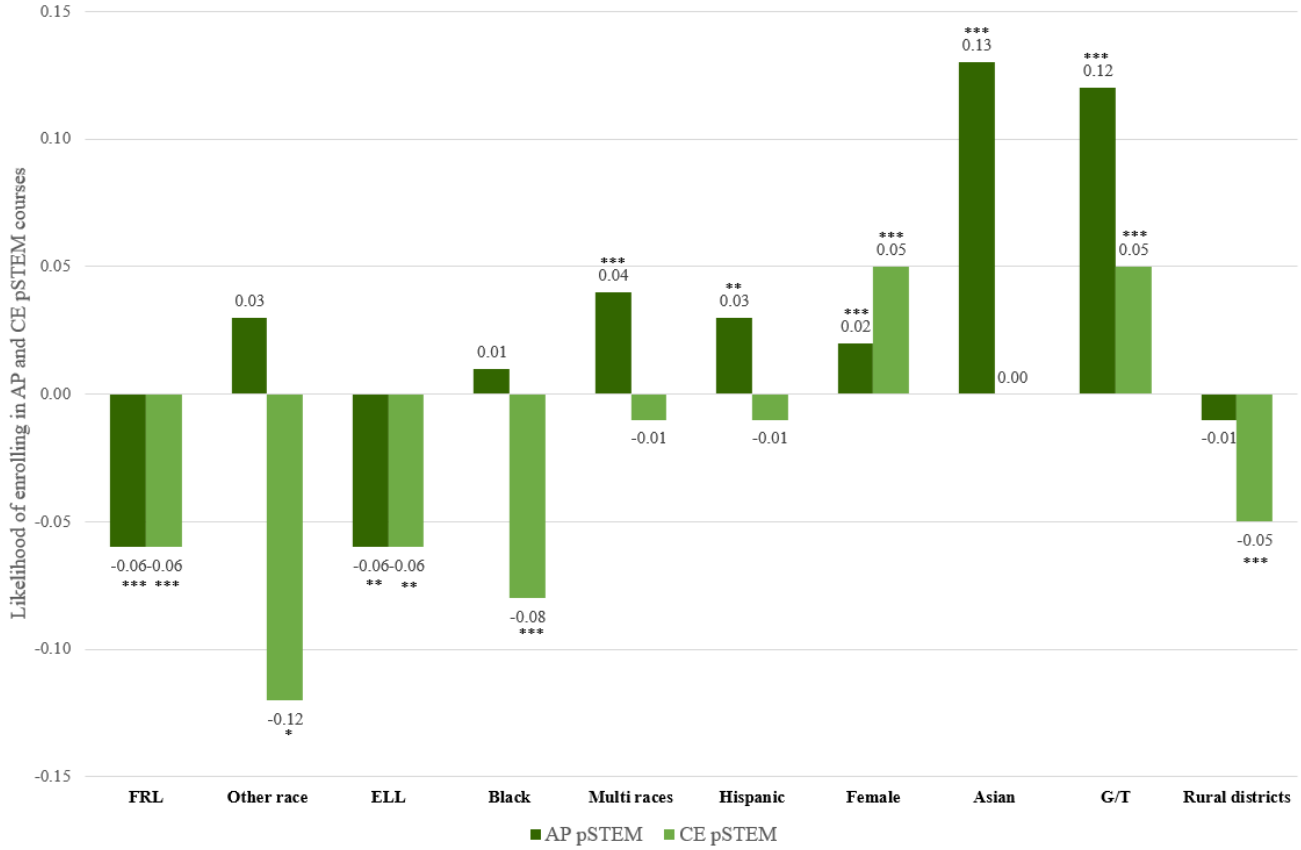


Figure 1B: Likelihood of Enrolling in AP & CE pSTEM Courses by Demographic and Programatic Characteristics



All estimates are in percentage points and are interpreted against their base category (e.g., Hispanic vs White students; FRL students vs non-FRL students)

****p<0.001 **p<0.01 *p<0.05*

Research Question 3 (RQ3)

Results from **Table 4** confirm that after controlling for students' demographic characteristics and past achievement, there are heterogenous probabilities of enrolling in different types of postsecondary institutions. G/T and female students tend to have higher likelihoods of enrolling in college. Among G/T and female students, if they were also categorized as either FRL or ELL students, these categorizations lower G/T and female students' likelihoods of attending a 4-year college. Therefore, if equity is what we aim for, there should be targeted programs that may help FRL and ELL students to not only access these rigorous courses in high school, but also to enroll in postsecondary institutions (McKenzie et al., 2020).

In addition, we acknowledge that this universal policy might have unintended consequences for students and school districts. For instance, this policy may push students who still need to get college ready to enroll in these rigorous courses (McKenzie et al., 2020). Instead of preparing them for other alternatives where the students might be more interested in or thrive in, such as Career and Technical Education (CTE) courses, we might fall into the trap of letting students struggle not only academically but also emotionally as they navigate the demanding process of enrolling in AP or CE courses. Consequently, some of these students might have to delay their high school graduation, which also delays their workforce participation because they are failing these rigorous courses and have to take remedial courses. This situation may have negative consequences financially for the students (Newman and Winston, 2016).

Table 4: Heterogeneous estimates among G/T, ELL,

	(1) Any post-secondary	(2) Top schools	(3) 4-year	(4) 2-year	(5) In-state	(6) Out-of-state
G/T	0.11*** (0.02)	0.04* (0.02)	0.13** (0.02)	-0.03** (0.01)	0.10*** (0.02)	0.00 (0.01)
ELL	-0.04 (0.03)	-0.02 (0.03)	-0.03 (0.03)	-0.03 (0.02)	-0.07* (0.03)	0.03** (0.01)
Female	0.09*** (0.01)	0.00 (0.00)	0.07*** (0.01)	0.02** (0.00)	0.08*** (0.01)	0.01* (0.00)
FRL	-0.14*** (0.01)	-0.08*** (0.01)	-0.12*** (0.01)	-0.02** (0.00)	-0.12*** (0.01)	-0.02** (0.01)
G/T *ELL	-0.06* (0.03)	-0.01 (0.06)	-0.03 (0.03)	-0.00 (0.02)	-0.03 (0.05)	-0.04 (0.03)
ELL*Female	0.02 (0.02)	-0.03 (0.02)	-0.01 (0.02)	0.02* (0.01)	0.02 (0.02)	-0.00 (0.01)
G/T*FRL	0.01 (0.02)	0.02 (0.01)	-0.01 (0.02)	0.03** (0.01)	0.02 (0.02)	-0.01 (0.00)
Pseudo R2	0.15	0.14	0.14	0.14	0.13	0.13

*Standard errors in parentheses. All models include district fixed effects. *** p<0.001, ** p<0.01, * p<0.05. Other demographic controls included in all of specifications here*

Policy Implications

Despite the Arkansas universal policy for both AP and CE courses, a large proportion of high school students still do not participate in or take advantage of this opportunity. Understanding the role of schools in guiding student decisions about AP and CE is vital. The multifaceted nature of student characteristics and their interplay in these outcomes underscores the importance of nuanced, disaggregated analysis for fully understanding and refining policy effects.

Future studies could address school factors related to availability of information and active recruitment of students into AP or CE classes. Such studies could consider the role of school personnel such as teachers and counselors in promoting (perhaps even nudging or making it a default for G/T or other students already demonstrating academic readiness), recruiting, and supporting students of all demographics in AP and CE courses. How proactive are schools in involving parents, especially those from minoritized or underserved populations, in conversations about the potential benefits and opportunities linked with AP and CE courses for higher education aspirations?

Moreover, individual factors such as student interest, student ability, and overall school experiences might illuminate why students do not participate in such courses, and more research could be targeted in this area. Given that a large proportion of Arkansas students opt for in-state postsecondary institutions, would it be more strategic to emphasize concurrent enrollment over AP courses for these populations?

Are there barriers that students must navigate in order to access concurrent enrollment courses? Do these challenges effect students populations unfairly?

The answers to these questions in part are determined by educational values by policymakers, parents, and students themselves, and thus may not be readily answered simply through careful research.

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Regarding the structure and quality of AP courses offered in Arkansas, studies may address teacher qualifications to teach AP courses, availability of specialized AP courses across rural and marginalized areas, as well as in Arkansas, studies may address teacher qualifications to teach AP courses, availability of specialized AP courses across rural and marginalized areas, as well as preparation for AP examinations. It is also essential to ask if the prerequisites for these courses may create barriers for marginalized and underserved populations.

Lastly, an intriguing area highlighted by past studies is the variability in outcomes between students enrolled in accredited versus unaccredited AP or CE courses. Preliminary insights suggest that students from unaccredited programs may be more likely to pursue postsecondary education. Investigating this counterintuitive trend, potentially explained by factors such as program participation, could offer valuable perspectives for policymakers and educators alike.

Since the Arkansas universal policy aimed to level the playing field in terms of access to these educational opportunities, however, residual disparities persist across minoritized and underserved student demographics. These disparities are nuanced; therefore, evidence suggests the need for equally nuanced policy implementation targeting the most disadvantaged populations.

Sources:

Djita, R., Barnes, K., & McKenzie, S. C. (2023). English Language Learners and Their Postsecondary Education Outcomes: Evidence from Arkansas. *Education Reform Faculty and Graduate Students Publications.* Retrieved from https://scholarworks.uark.edu/edrepub/145

Ebrahiminejad, H., Waller, D. R., Ohland, M. W., & Osman, H. (2021, July 26). Advanced Placement programs and engineering undergraduate first-year GPA. 2021 ASEE Virtual Annual Conference Content Access.

Jones, S. J. (2014). Student participation in dual enrollment and college success. Community College Journal of Research and Practice, 38(1), 24-37. https://doi.org/10.1080/10668926.2010.532449

Klopfenstein, K. (2004). Advanced Placement: Do minorities have equal opportunity? Economics of Education Review, 23(2), 115-131.

McKenzie, S. C., & Ritter, G. (2005). Concurrent enrollment vs. Advanced Placement courses. Policy Briefs. https://scholarworks.uark.edu/oepbrief/111

McKenzie, S. C., & Ritter, G. W. (2016). Advanced Placement in Arkansas: Increasing equity. Retrieved from https://scholarworks.uark.edu/oepbrief/13

Newman, K. S., & Winston, H. (2016). Reskilling America: Learning to labor in the twenty-first century. Metropolitan Books.

Ricciardi, C., & Winsler, A. (2021). Selection into advanced courses in middle and high school among low-income, ethnically diverse youth. Journal of Advanced Academics, 32(3), 291-323.

Warne, R. T. (2017). Research on the academic benefits of the Advanced Placement program: Taking stock and looking forward. SAGE Open, 7(1).

Warne, R. T., Larsen, R., Anderson, B., & Odasso, A. J. (2015). The impact of participation in the Advanced Placement program on students' college admissions test scores. The Journal of Educational Research, 108(5), 400-416.

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