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Abstract

Participation in Advanced Placement (AP) classes and AP test-taking are widely viewed as indicators of students’ college readiness. We analyzed enrollment in AP courses and AP test outcomes in Arizona to document disparities in students’ access to rigorous curricula in high school and outline some implications of these patterns for education stakeholders. Findings suggest that although 80% of high schools in Arizona offered at least one AP course, the total number of AP courses offered varied considerably across schools. Small schools and schools that served higher percentages of minority students were less likely to offer a wide range of AP courses than large schools and schools with majority White student populations. Although Hispanic students were underrepresented in AP courses, they had the highest test-taking rate. Only a third of the Hispanic students who took AP courses passed the AP test.

Key Words

AP courses, opportunity gap, college readiness
Introduction

Participation in Advanced Placement (AP) courses is widely viewed as an indicator of a student’s college readiness, particularly by selective colleges and universities (Geiser & Santelices, 2004). For this reason, AP courses and their corresponding exams play an important role in high school students’ college preparation and admission. The College Board’s AP Program supports 38 AP courses in a range of subjects including Calculus, Biology, World History, Studio Art, and foreign languages (see https://apstudent.collegeboard.org/apcourse).

Many colleges and universities offer college credit to students who receive a score of at least three out of five possible points awarded on AP exams. College students with AP credit are often able to skip general studies courses and take courses related to their majors earlier than students without AP credits.

We analyzed enrollment in AP courses and AP test outcomes in Arizona to document disparities in students’ access to and participation in AP courses as well as pass rates of AP tests. Because AP enrollment and outcomes are often viewed as important metrics of high school students’ access to rigorous curricula, our analysis highlights one dimension of what Carter and Welner (2013) described as the opportunity gap, or inequalities in the distribution of educational opportunities.

We focused on Arizona because minority students are a majority of the state’s public school population. In 2009-2010, Black, Hispanic, and American Indian students comprised 53% of public school students in Arizona (authors’ calculations from Arizona Department of Education data).

Given that Arizona’s demographics reflect what the demographics of the nation are projected to look like in 2025 (Glass, 2008), current patterns of educational access and opportunity in Arizona might provide insight into policy issues that school leaders in other states might face in the future.

Background

Participation in AP courses has increased during the past two decades because of the growing reputation of the AP program, colleges’ increased reliance on AP course participation as a measure of college readiness, and federal policies aimed at expanding participation (College Board, 2011; Shaw, Marini, & Mattern, 2013). AP courses and exams have been touted as indicators of equity and excellence (The Education Trust, 2013; Hallett & Venegas, 2011).

Even after controlling for student background and prior academic performance, students who participate in AP courses and exams tend to perform better on a range of college outcomes than their peers who do not take AP courses (Bowen, Chingos, & McPherson, 2009; Chajewski, Mattern, & Shaw, 2011; Mattern, Shaw, & Xiong, 2009; Scott, Tolson, & Lee, 2010; Tierney, Bailey, Constantine, Finkelstein, & Hurd, 2009). Students who attend high schools that offer a greater variety of AP courses are more likely to enroll in more selective colleges and universities (Klugman, 2012).

Finally, students who pass an AP exam in high school and place out of introductory college courses do as well or better in advanced college courses than students who take their introductory courses in college (Burdman, 2000; College Board, 2011).
Though the claim that AP course-taking and performance are significant predictors of college success has been criticized by some (Geiser & Santelices, 2004; Sadler & Tai, 2007; Thompson & Rust, 2007) and supported by others (Shaw et al., 2013), there appears to be a greater consensus that AP course participation increases a student’s chances of being admitted to college and receiving more financial aid (Brelend, Maxey, Gernand, Cumming, & Trapani, 2002; Hacsi, 2004; Santoli, 2002), a finding that holds when controls for student demographic variables are included in the analysis (Chajewski et al., 2011).

Yet, there have been persistent inequalities in the distribution of AP courses across schools (The Education Trust, 2013; Hallet & Venegas, 2011). Students of color and students from economically disadvantaged backgrounds are enrolled in AP courses at lower rates than majority students (The Education Trust, 2013; Klopfenstein, 2004; Moore & Slate, 2008; VanSciver, 2006). School characteristics rather than student enrollment in AP courses are associated with AP course availability; schools serving low-income and minority students tend to offer fewer AP courses than their counterparts in more affluent communities (Barnard-Brak, McGaha-Garnett, & Burley, 2011; Dougherty, Millor, & Jian, 2006; Klopfenstein, 2004; Moore & Slate, 2008; Zarate & Pachon, 2006).

**Purpose**

Because AP course-taking has been linked to college success as well as college admissions, bureaucrats at the U.S. Department of Education have invested in efforts to increase the participation of low-income students in AP courses (U.S. Department of Education, 2014). More recently, federal officials in the U.S. Department of Education’s Office of Civil Rights have worked with school districts to ensure that minority students have access to AP courses and other educational experiences aimed at increasing students’ college readiness (U.S. Department of Education, 2013).

The purpose of this study was to describe the demographic characteristics of students enrolled in AP courses in Arizona to explore disparities within the state’s schools, determine the extent to which students are taking and passing AP tests, and outline the implications of these patterns of AP enrollments and outcomes for education stakeholders.

**Method**

The data for this analysis were drawn from the U.S. Department of Education’s 2009-2010 Civil Rights Data Collection (CRDC). The CRDC collects information on a wide range of school and district characteristics, including student enrollment and participation in educational programs and services by race/ethnicity, gender, limited English proficiency, and disability.

We selected all of the regular public high schools included in the CRDC dataset, which comprised all high schools in Arizona located in districts that served more than 3,000 students, and data on high schools in 21 smaller districts. Our final sample was comprised of 172 schools.

We checked our CRDC sample against the data available in the Common Core of Data (CCD) to assess the representativeness of the sample of schools used in our analysis. Forty-eight unified and high school districts were not included in the CRDC sample, all small districts with enrollments of less than 3,000 students. These 48 districts, over half of which (60%) were rural districts, enrolled 19,514 high school students. The 172 schools in our sample served 251,490 students, or 93% of the students...
attending regular public high schools in Arizona. Because school districts with less than 3,000 students are underrepresented in the CRDC dataset, the number of high schools in Arizona that do not offer AP courses is likely higher than reported herein. In addition, only one Arizona charter school was represented in the CRDC dataset; therefore, we did not include charter schools in the analysis.

We calculated descriptive statistics using SPSS. The data allowed us to explore the availability and types of Arizona AP courses, as well as the demographic characteristics of schools and AP students.

Results

We began by looking at the characteristics of schools that offered one or more AP courses and compared these schools to schools that did not offer AP courses. Approximately 80% of the 172 public high schools in the sample provided at least one AP course, but the number of AP courses offered varied considerably. The majority (64%) of these schools were located in cities and suburbs and enrolled approximately 1,750 students on average. Sixty-four percent of the schools that offered AP courses provided between six and 15 courses, whereas 20% provided five or fewer.

The 34 schools that did not provide AP courses were among the smallest in our sample, with enrollments ranging from 20 to 860 students. The schools that did not offer AP courses served a total of 11,950 students, with an average enrollment of approximately 350 students. Seventy-four percent of these schools were located in small towns and rural areas of the state and served a substantially higher percentage of American Indian students and a lower percentage of White students than the full sample (see Table 1).

Within the group of 138 schools that offered at least one AP course, the smallest schools in the sample also offered fewer types of AP courses. While all of the largest schools offered AP mathematics and 77% offered AP science courses, only 41% of the schools in the bottom quartile for student enrollment (schools with 1,370 or fewer students) offered AP courses in math and science. Fifty-six percent offered AP mathematics and 53% offered AP science; 41% offered both.
Table 1

Demographics of Schools and AP Students

<table>
<thead>
<tr>
<th></th>
<th>All schools (172 schools)</th>
<th>Schools that did not offer AP courses (34 schools)</th>
<th>Schools that offered one or more AP courses (138 schools)</th>
<th>AP students (138 schools)</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Indian</td>
<td>6%</td>
<td>11%</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Asian American</td>
<td>3%</td>
<td>1%</td>
<td>3%</td>
<td>6%</td>
</tr>
<tr>
<td>Black</td>
<td>6%</td>
<td>5%</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>39%</td>
<td>42%</td>
<td>38%</td>
<td>31%</td>
</tr>
<tr>
<td>White</td>
<td>46%</td>
<td>41%</td>
<td>48%</td>
<td>55%</td>
</tr>
<tr>
<td>Total Students</td>
<td>251,490</td>
<td>11,950</td>
<td>239,540</td>
<td>32,495</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations from CRDC data; figures may not add to 100% because of rounding.

The 138 schools that offered one or more AP courses enrolled a total of 239,540 students. Of those, 32,495 (14%) took at least one AP class. In nearly half (43%) of the schools that offered AP courses, 10% or fewer students enrolled in AP courses. On average, Asian American and White students were overrepresented in AP courses. Conversely, American Indian, Black, and Hispanic students were underrepresented in AP courses. The AP participation gap for Hispanic students was substantial (7%). Because our measure of AP participation was broad (a student was counted as an AP student if he or she was enrolled in at least one AP course) we do not think the underrepresentation of Hispanic students we document here is attributable to the relatively fewer AP courses offered in smaller and rural schools.

We also examined the distribution of AP courses by the percentage of students eligible for free and reduced-price lunch;
however, we were missing information on that variable for 15% of the schools, including all of the schools in one urban school district. These schools enrolled 31,100 students, or 12% of the students served by our sample of schools. Schools that were missing information on this variable tended to serve fewer minority students and offer a slightly higher number of AP classes than the schools with complete information on all variables. The correlation between the percentage of students receiving free and reduced-price lunch and the percentage of minority enrollment was .84 (N=146, \( p < .001 \)).

Although the results in Table 1 suggest that, on average, the racial demographics of Arizona students taking at least one AP course roughly mirrored the demographics of the schools they attended, these figures mask some school-level inequalities in access to AP courses. In 37 schools, Hispanic students, the second largest demographic group attending Arizona’s public schools, were underrepresented in AP courses by more than 10 percentage points.

Our next step was to examine the association between school demographics and the number of AP courses offered. As the total school enrollment of Hispanic, Black, and American Indian students increased, the number of AP courses schools offered decreased. When White students comprised more than 50% of a school’s student population, the number of AP courses offered tended to increase (see Table 2).

Table 2

Percentage Minority Enrollment and Number of AP Courses Offered

<table>
<thead>
<tr>
<th>Percentage Minority Students</th>
<th>No AP courses</th>
<th>Between 1 and 5</th>
<th>Between 6 and 10</th>
<th>Between 11 and 15</th>
<th>Greater than 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>25% or less</td>
<td>18%</td>
<td>11%</td>
<td>18%</td>
<td>31%</td>
<td>48%</td>
</tr>
<tr>
<td>Between 26 and 50%</td>
<td>24%</td>
<td>22%</td>
<td>35%</td>
<td>33%</td>
<td>30%</td>
</tr>
<tr>
<td>Between 51 and 75%</td>
<td>32%</td>
<td>19%</td>
<td>20%</td>
<td>23%</td>
<td>17%</td>
</tr>
<tr>
<td>Greater than 75%</td>
<td>26%</td>
<td>48%</td>
<td>27%</td>
<td>13%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations from CRDC data; figures may not add to 100% because of rounding.
Table 3 provides an overview of AP test-taking and outcomes. Fifty-four percent of the 32,495 students enrolled in one or more AP courses took AP tests in at least one subject, and 32% of enrolled students passed at least one AP test. Although Hispanic students were the racial/ethnic group with the largest proportion of test takers (61%), only 26% of the Hispanic students enrolled in AP courses passed at least one AP test. White and Asian students had lower rates of AP test-taking than Hispanic students but passed AP tests at higher rates. As Table 1 indicates, American Indian students had the least access to AP courses and the lowest participation rates among all racial/ethnic groups. They also had the lowest test-taking and test-passing rates.

Table 3

*Student Enrollment, Test Taking, and Outcomes*

<table>
<thead>
<tr>
<th></th>
<th>Enrollment in AP courses</th>
<th>Percentage tested</th>
<th>Percentage of enrolled students who passed one or more AP exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Indian</td>
<td>560</td>
<td>21%</td>
<td>8%</td>
</tr>
<tr>
<td>Asian</td>
<td>2,600</td>
<td>52%</td>
<td>37%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>8,410</td>
<td>61%</td>
<td>26%</td>
</tr>
<tr>
<td>Black</td>
<td>1,495</td>
<td>40%</td>
<td>14%</td>
</tr>
<tr>
<td>White</td>
<td>19,430</td>
<td>53%</td>
<td>35%</td>
</tr>
<tr>
<td>Total</td>
<td>32,495</td>
<td>54%</td>
<td>32%</td>
</tr>
</tbody>
</table>
Discussion
Enrollment in Advanced Placement courses continues to increase nationally, but disparities between the percentage of White students and the percentage of minority students taking AP courses persist. Simply put, fewer students of color have access to AP courses because their schools either do not offer AP courses or offer only a limited selection (see Table 2).

The data for Arizona mirror the national pattern of increased participation in the aggregate and inequitable course availability for Black, Hispanic, and American Indian students (The Education Trust, 2013). Unequal access to high-quality education places many minority and low-income students at a disadvantage when curriculum-based or content-focused achievement tests such as the AP test become increasingly important in the college admissions process (Shaw et al., 2013).

According to the Education Trust (2013), if these students were equally served, more than 640,000 additional students of color and low-income students would benefit nationally. Notably, Arizona students’ test-taking and test-passing rates are well below the national average (College Board, 2011). Nationwide, 28% of the class of 2010 took at least one AP exam in high school and 17% scored three points or higher, while the corresponding figures for Arizona students’ test-taking and test-passing rates were 16% and 9%, respectively.

Implications
Marzano (2003) argued that a “guaranteed and viable curriculum,” or a combination of the opportunity to learn a challenging curriculum and time, is the school-level factor that contributes the most to student achievement. A school-level factor refers to a feature of schools that can be changed without a large increase in resources. All students should have access to college preparatory curricula such as those available in AP courses, as well as equal opportunities to compete in the college admissions process. Klepfzer and Hull (2012) demonstrated that taking AP courses can help mitigate the effects of below-average achievement and economic disadvantage in high school on students’ post-secondary success.

The college persistence rates of low-income and low-achieving students who took AP courses closely resembled those of their high-income, high-achieving peers.

This is significant because researchers have shown that the individual and social returns to education are substantial. College graduates are more likely to register to vote, delay marriage and childbearing, have lower divorce rates, and have a higher probability of being employed than their less educated peers (Avery & Turner, 2012; Long, 2010).

On average, college graduates earn 84% more than high school graduates over the life course (Carnevale, Rose, & Cheah, 2011). As Levin (2009) highlighted, increasing educational equity or closing the opportunity gap makes economic sense because of the direct effects on individuals’ earnings as well as the indirect societal benefits.

Our analysis indicated that access, enrollment, and achievement gaps in AP course-taking continue to be salient in Arizona. High schools in low-income or rural areas may not be able to attract or retain teachers trained to teach AP courses (Monk, 2007). Minority students often experience barriers to participation in AP courses (Sheperd, 2008; Tyson, 2013).
Teachers or counselors may not refer students to AP classes because of perceptions about their academic abilities or educational goals (Campbell, 2012). Some students are reluctant to enroll in AP courses because they are afraid they will not be academically successful or that they will be among the few minority students in these classes (Tyson, Darity & Castellino, 2005).

Finally, some districts that serve working class and racially diverse student populations may be reluctant to increase AP course offerings because district administrators perceive little demand and need among their students and view other resource and staffing needs as more pressing (Klugman, 2013). These issues highlight the need for inclusive and equitable policies and programs aimed at increasing access, test-taking, and preparing students for AP courses and examinations.

Though the Arizona Department of Education receives federal funds to provide partial exam fee waivers for AP students eligible for the federal free and reduced-price lunch program, these funds are directed toward students and do not help low-income and rural schools expand their AP course offerings or improve students’ academic preparation for AP courses. Investments in rigorous curricula, course materials, and highly qualified teachers should be targeted at the communities with the highest needs to ensure they have the means to support expanded enrollment (Holstead, Spradlin, McGillivray, & Burroughs, 2010).

In Arizona, Hispanic students, the most underrepresented group in AP course-taking, have a high AP test-taking rate but a low AP test-passing rate. This suggests that once enrolled, these students are interested in the opportunities AP courses provide.

Such students would benefit from academic support to help them pass AP exams. District and school leaders should also consider modifying policies that limit AP course enrollment to students with the highest academic achievement (Tyson, 2013) and develop programs and strategies to prepare students for AP rigor (Flores & Gomez, 2011).

For example, schools and districts should examine the curricula of prerequisite or gateway classes and the content covered in existing AP courses to confirm that students are well prepared for AP classes and exams (Hallett & Villegas, 2011).

Another promising strategy for expanding the AP pipeline is to identify academically promising middle school students and ensure they are enrolled in rigorous and challenging classes as they transition into high school (VanSciver, 2006). Teacher training, online courses, and student incentives should also be explored as avenues for increasing student access, enrollment, and success in AP classes (Holstead et al., 2010; Sheperd, 2008; U.S. Department of Education, 2014).

Making rigorous curricula available to all students should be an imperative for all schools. Because AP courses can help bridge gaps in college access and achievement, expanding students’ access to a broader range of AP courses and expanding students’ participation in courses and testing is vital (The Education Trust, 2013). As Berliner (2013) and others have observed, “It’s really the opportunity gap, not the achievement gap …” (para. 8; see also Welner & Carter, 2013).
Author Biographies

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References


