SUPPORTING THE TRANSITION TO COLLEGE:

Accelerated learning access, outcomes, and credit transfer in Oregon

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Introduction

Accelerated learning—defined in Oregon as "educational experiences that provide high school students with the opportunity to earn college credit while in high school" (Higher Education Coordinating Commission, n.d.)—represents a promising strategy for improving the educational attainment of all students. Research has found that these programs are positively associated with high school graduation; academic achievement in high school; and college access and readiness, credit accumulation, and graduation (Development Services Group, 2017).

Accelerated learning appears to improve students' postsecondary outcomes in two main ways: by preparing them for college through increased academic rigor and expectations in high school and by shortening the time to complete a postsecondary degree, thereby reducing college costs, through the accumulation of postsecondary credits while in high school (Iatarola, Conger, & Long, 2011; Long, Conger, & Iatarola, 2012; Karp, 2015). Many education leaders also view accelerated learning as a strategy to improve the college completion of historically underrepresented students by helping these students better navigate the high school-to-college transition through direct experiences with postsecondary expectations and systems (Karp, 2015).

Oregon has invested significant resources in expanding access to accelerated learning, and education leaders from state agencies and secondary and postsecondary institutions are committed to ensuring that these programs are sustainable, equitable, and effective (Oregon Department of Education, 2017). Oregon stakeholders intend to use the data presented in this report to inform policy and legislative discussions that can improve accelerated learning programs in the state.

This study addresses the following main questions:

- ***Participation in accelerated learning:*** What are accelerated learning participation rates overall and by model (box 1) among Oregon public high school students in 2013/14, 2014/15, and 2015/16? What school- and student-level characteristics predict participation in accelerated learning?
- ***High school-to-college outcomes:*** Among students in the class of 2014/15, what is the relationship between accelerated learning participation and high school graduation, college enrollment, and college persistence?
- ***Credit transfer:*** Among accelerated learning students in the class of 2014/15 who attended an Oregon public university after high school, what percentage of their college credits earned in high school transferred to university? Among students in the class of 2014/15 who passed dual-credit college math or English and attended an Oregon public university or community college after high school, what percentage took a lower-level course, repeated the course, took a higher-level course, or took no math or English at all?

The report concludes with considerations for further investigation to support equitable access to accelerated learning and improvements in accelerated learning outcomes and credit transfer.

Box 1. Oregon accelerated learning models in this report

Accelerated learning – Accelerated learning, also called accelerated college credit in Oregon, refers to various ways to earn college credit while attending high school in Oregon. This report includes the following types of accelerated learning:

- **Dual credit models (called high school-based college credit partnerships in Oregon):** Community college or university courses students take at high school for college credit. This report provides data on community college dual credit, university dual credit, and the two combined, as well as career technical education (CTE) dual credit courses offered by the community colleges.

  There are three types of high school-based college credit partnerships in Oregon, which are all categorized as "dual credit" in higher education course transcript data. Thus, it is impossible to report on each type separately, and the report uses the term "dual credit" to refer to all three types of high school-based college credit. The three types of high school-based college credit partnerships are:

  - **Dual credit** – Community college or university courses offered at a high school and taught by a high school teacher with traditional certification to teach dual credit (commonly a master's degree in the subject area).
  - **Sponsored dual credit** – Community college or university courses offered at a high school and taught by a high school teacher partnering with a sponsoring faculty member at a college or university typically through a professional learning community.
  - **Assessment-based learning credit** – High school courses in which students can earn college credit by demonstrating they have achieved the course learning outcomes on assessments developed by faculty at a sponsoring college or university.

- **Direct enrollment** – Community college or university credit-bearing courses that high school students take on the community college or university campus or online along with college students taught by a college faculty member. Direct enrollment includes structured programs on college campuses, such as expanded options (established by 2005 Oregon Senate Bill 300) and early college, as well as direct enrollment by individual students in credit-bearing courses on a college campus. High school student course enrollment in continuing education and other courses that do not bear credit are not considered direct enrollment. This report provides data on community college direct enrollment, university direct enrollment, and the two combined.
- **Advanced Placement (AP) courses and exams** – Courses that prepare students for the AP exam. Students may take the exam without taking the course or take the course without taking the exam. College credit is typically only available to those who take the exam and earn a certain score. This report provides data on AP courses and exams.
- **International Baccalaureate (IB) courses** – Courses that prepare students for the IB exam. Students may take the exam without taking the course or take the course without taking the exam. College credit is typically only available to those who take the exam and earn a certain score. This report provides data on IB courses; the authors did not have access to IB exam data.

Note: Community college dual credit and sponsored dual credit consist of lower-division collegiate (LDC) and CTE courses, which have an additional federal funding source through the Carl D. Perkins Career and Technical Education Act of 2006. Due to the push in Oregon to increase CTE participation, the study also examines CTE separately. The authors had access to dual credit and sponsored dual credit data only for students who registered for these classes for college credit; additional students may have taken these courses at their high school but not registered for them with the college.

Source: Higher Education Coordinating Commission, n.d.

SUMMARY OF KEY FINDINGS

Participation in accelerated learning

- Participation in all forms of accelerated learning increased over a three-year period (from 2013/14 to 2015/16). Dual credit was the most common form of accelerated learning, and AP coursetaking was the second most common.
- Pass rates in accelerated learning varied, with 97 percent of dual-credit participants and 87 percent of direct-enrollment participants passing at least one course and 61 percent of AP exam-takers passing at least one exam in 2015/16.
- Most schools in Oregon offered at least one form of accelerated learning, and largely driven by differences in AP/IB participation, schools in urban areas had higher accelerated learning participation rates than schools in rural and suburban areas.
- Students who were economically disadvantaged were less likely to participate in accelerated learning compared to their peers who were not economically disadvantaged. Similarly, schools with a higher percentage of economically disadvantaged students had lower participation rates in accelerated learning.
- Predictors of participation in accelerated learning were the same as predictors of graduating from high school—and they can be traced to middle school. Specifically, malleable measures of achievement and engagement in middle school (assessment scores, attendance, discipline, and school mobility) were consistently related to accelerated learning participation.

High school-to-college outcomes

- In the class of 2014/15, accelerated learning participants were 30 percentage points more likely to graduate from high school, 25 percentage points more likely to enroll in college, and 22 percentage points more likely to persist in college than similar peers who did not take accelerated learning in high school. Findings were consistent for Black, Latino/Hispanic, and American Indian/Alaska Native students.
- The positive association between accelerated learning and education outcomes varied in magnitude based on accelerated learning model.

Credit transfer

- Overall, 15 percent of students in the class of 2014/15 transferred less than half the credits they earned in high school to the Oregon public university they attended after high school.
- Nearly 25 percent of students in the class of 2014/15 who earned credit from dual-credit math in high school and 9 percent of students who earned credit from dual-credit English in high school took the same course or a lower-level course at the Oregon public community college or university they attended after high school.

DATA SOURCES AND KEY VARIABLES USED IN THE STUDY

The authors used data from various sources to build a longitudinal database that linked student demographic information and K–12 outcomes, accelerated learning data, and postsecondary outcomes.

Student demographic information and K-12 outcomes. The study had K–12 records from the Oregon Department of Education (ODE) beginning in 2004/05, so the cohorts in this study could be followed beginning in elementary school. The following variables are used:

- Gender
- Race/ethnicity
- Ever economically disadvantaged – defined as ever marked eligible for free or reduced-price lunch in K–12
- English learner status
    - Former English learner – defined as received English learner services in K–8 but not in high school
    - Current English learner - defined as received English learner services in high school (student may have also received English learner services in K–8)
    - Ever English learner – defined as ever received English learner services in K–12
    - Never English learner – defined as never received English learner services in K–12
- Ever had an individualized education program (IEP) in K–12
- Met or exceeded state standards on the reading and math state assessments in grade 8
- High achiever – defined as scoring in the top quartile on both the reading and math Smarter Balanced Assessments in high school
- Average annual attendance rate in middle school – defined as the average percentage of school days attended in grades 6, 7, and 8
- School mobility – defined as the number of schools attended in grades 6, 7, and 8
- Number of suspensions and expulsions in grades 6, 7, and 8
- Urban, rural, or suburban high school – based on National Center for Education Statistics locale codes
- High school graduation

Accelerated learning data. **AP and IB course enrollment data** came from a new ODE data collection (the class roster collection) that started in 2014/15. Thus, these data were available for only 2014/15 and 2015/16. **AP exam data** came from the College Board and were available for all years in the study. The authors did not have access to IB exam data. **Dual-credit and direct-enrollment course enrollment and performance data** came from the Oregon Higher Education Coordinating Commission (HECC) and were available for all years in the study.

Postsecondary outcomes. ODE also provided postsecondary enrollment and completion data at postsecondary institutions across the country from the National Student Clearinghouse (NSC). We report two outcomes from NSC for the class of 2014/15: college enrollment (the proportion of students who enrolled in college in 2015/16) and college persistence (the proportion who were still enrolled in college in fall 2016). HECC also provided postsecondary enrollment, course enrollment and performance, and completion data for students at public postsecondary institutions in Oregon.

More details on the study methods and detailed findings are available in the appendixes.

FINDINGS: PARTICIPATION IN ACCELERATED LEARNING

Participation in all forms of accelerated learning increased over a three-year period (from 2013/14 to 2015/16). Dual credit was the most common form of accelerated learning, and AP coursetaking was the second most common.

Most recently, in 2015/16, a third of Oregon public high school students took any type of accelerated learning, and nearly half of all juniors and seniors took an accelerated learning course (table 1).

The most popular form of accelerated learning was dual credit, with 18 percent of all Oregon public high school students and 25 percent of juniors and seniors taking a dual-credit class in 2015/16 (see table 1). Participation increased over time; among students in grades 11 or 12, the percentage taking dual credit at a community college or university rose from 20 percent in 2013/14 to 25 percent in 2015/16. Community colleges offer many more dual-credit courses than universities, and there are more community colleges in Oregon (17) than public universities (seven). Thus, community college dual credit may be more accessible than university dual credit. Likewise, community college dual-credit coursetaking was much more common than university dual-credit coursetaking, with 16 percent of high school students taking community college dual credit compared with 3 percent taking university dual credit in 2015/16.

The second most popular form of accelerated learning was AP courses, with 15 percent of all Oregon public high school students and 22 percent of students in grades 11 or 12 taking an AP class in 2015/16 (table 1). Although the rate of AP coursetaking was high, many students who took an AP class did not take the corresponding exam. In 2015/16, for example, 22 percent of Oregon high school juniors or seniors took an AP class, but only 13 percent took an AP exam (see table 1). Similarly, a small percentage of students took the AP exam but not an AP course; in 2015/16, less than half of 1 percent of students took an AP exam but not an AP course, representing 4 percent of all AP exam-takers, and in 2014/15, 1 percent of students took an AP exam but not an AP course, representing 9 percent of all AP exam-takers.

Table 1. Percentage of students participating in various forms of accelerated learning, by grade level (2013/14 to 2015/16)

	Statewide participation rate Grades 9–12			Statewide participation rate Grades 11 and 12		
	2013/14	**2014/15**	**2015/16**	**2013/14**	**2014/15**	**2015/16**
Any accelerated learning	22.8	31.1	32.8	31.6	43.2	45.3
Dual credit	14.9	16.8	18.3	20.2	22.5	24.5
Community college dual credit	13.5	15.1	16.2	18.2	20.2	21.3
CTE dual credit	5.9	6.1	6.3	6.5	6.8	7.0
University dual credit	2.0	2.6	3.2	2.9	3.7	5.1
Direct enrollment[a]	4.5	4.6	4.8	7.6	7.8	8.1
Community college direct enrollment	4.0	4.2	4.3	6.8	7.3	7.4
University direct enrollment	0.5	0.4	0.5	0.8	0.6	0.8
AP exam	8.0	8.8	9.2	11.5	12.4	12.8
AP course	N/A	13.8	15.1	N/A	20.8	22.1
IB course	N/A	4.1	4.3	N/A	6.6	7.0

N/A indicates AP and IB course enrollment data are not available in that year because data collection began in 2014/15.

Note: Some students take multiple forms of accelerated learning, including the same type at a community college and a university, so community college and university percentages do not sum to the overall percentage for type, and percentages across types do not sum to any accelerated learning percentage. Grades 9–12 sample includes 187,381 students in 2013/14; 188,502 students in 2014/15; and 190,080 students in 2015/16. Grades 11–12 sample includes 95,418 students in 2013/14; 96,499 students in 2014/15; and 97,660 students in 2015/16.

[a] High school students also enroll directly in community college courses that have no credit attached to them, but these are not counted in the direct-enrollment rates since accelerated learning is defined as opportunities to earn college credit in high school. In 2013/14, 2014/15, and 2015/16, respectively, 5 percent, 5 percent, and 4.6 percent of high school students took non-credit-bearing courses at community colleges (either on campus or online). Sixty-five percent of these non-credit-bearing courses are continuing education courses (e.g., driver's education and various fitness, art, language, and vocational courses), 25 percent are remedial (GED, adult basic education, credit recovery, and developmental education), 6 percent are CTE courses, and 4 percent are LDC courses.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

In 2014/15 and 2015/16, respectively, 23 percent and 24 percent of students took one type of accelerated learning, and the remaining 8 to 9 percent of students participated in a combination of accelerated learning models (table 2). The most common combination was taking dual credit and an AP exam and/or course in the same year, with 6 percent of students doing this in 2015/16.

Table 2. Percentage of students who took one form of accelerated learning versus multiple forms of accelerated learning (2014/15 and 2015/16)

	2014/15 participation rate	2015/16 participation rate
Any accelerated learning total	31.1	32.8
Student took only one form of accelerated learning	22.7	23.5
Dual credit only	9.1	9.5
AP exam and/or course only	7.9	8.2
Direct enrollment only	3.0	3.0
IB course only	2.7	2.8
Student took multiple forms of accelerated learning	8.4	9.3
Dual credit and AP exam and/or course	5.6	6.2
Dual credit and direct enrollment	0.8	1.0
All other combinations	2.0	2.1

Note: Participation rates are mutually exclusive and add up to the percentage taking any accelerated learning. Sample includes 188,502 students in grades 9–12 in 2014/15 and 190,080 students in grades 9–12 in 2015/16.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

Pass rates in accelerated learning varied, with 97 percent of dual-credit participants and 87 percent of direct-enrollment participants passing at least one course and 61 percent of AP exam-takers passing at least one exam in 2015/16.

Accelerated learning pass rates have stayed the same over a three-year period (2013/14–2015/16) and were highest for dual-credit students and lowest for AP exam-takers (table 3). Focusing on 2015/16, nearly all students (97 percent) who took dual credit passed nearly all their courses (94 percent of courses attempted), taking and passing two to three classes.

In contrast, direct-enrollment students tended to take more courses and pass at lower rates; 88 percent passed at least one course, and on average, students passed 71 percent of their courses, taking about six classes and passing four. It is important to keep in mind that the experiences of direct enrollment students vary. For example, in 2015/16, the range of direct-enrollment coursetaking was between 1 and 36 courses; about a quarter of direct-enrollment students took one direct-enrollment course, and another quarter took 10 to 36 courses. Some students took a single course on a college campus (or online), and other students were involved in early college high schools on a college campus, where all courses were college courses.

AP exam-takers had the lowest pass rates, with 61 percent earning a 3 or above on at least one AP exam. On average, students passed about half their AP exams, taking about two and passing one.

Table 3. Pass rates in accelerated learning (2013/14 to 2015/16)

	2013/14	2014/15	2015/16
Dual-credit participants[1]			
% passed at least one course	97	97	97
Average % of courses passed	94	94	94
Average number of courses taken	2.4	2.4	2.4
Range of courses taken (minimum-maximum)	1–16	1–14	1–17
Average number of courses passed	2.3	2.3	2.3
Direct-enrollment participants			
% passed at least one course	87	89	88
Average % of courses passed	69	71	71
Average number of courses taken	5.6	5.7	5.8
Range of courses taken (minimum-maximum)	1–33	1–46	1–36
Average number of courses passed	3.8	4.0	4.0

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	2013/14	2014/15	2015/16
AP exam participants			
% passed at least one exam	62	62	61
Average % of exams passed	56	56	54
Average number of exams attempted	1.6	1.6	1.6
Range of tests taken (minimum-maximum)	1–7	1–10	1–9
Average number of exams passed	1.0	1.0	1.0

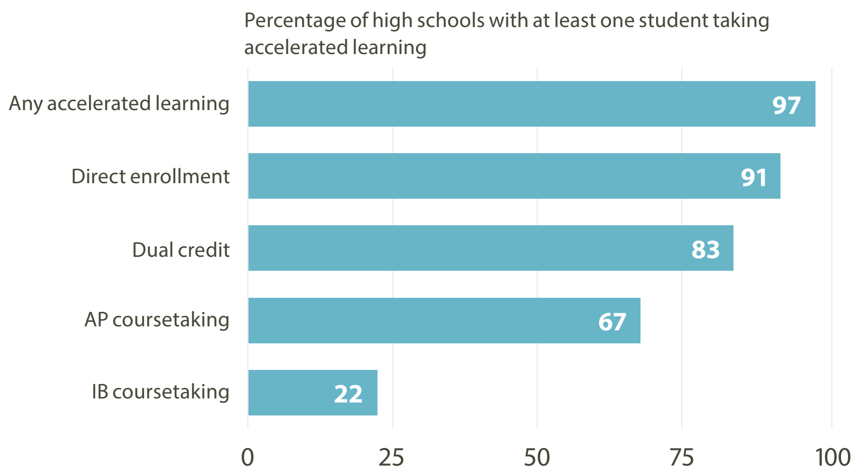
Note: Dual-credit participants include 27,989 students in 2013/14; 31,722 students in 2014/15; and 34,723 students in 2015/16. Direct-enrollment participants include 8,352 students in 2013/14; 8,659 students in 2014/15; and 9,085 students in 2015/16. AP exam participants include 14,929 students in 2013/14; 16,501 students in 2014/15; and 17,418 students in 2015/16. For dual credit and direct enrollment, pass is defined as earning a grade of A, B, C, or P (pass). For AP, pass is defined as earning a score of 3 or higher on the AP exam.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

Most schools in Oregon offered at least one form of accelerated learning, and largely driven by differences in AP/IB participation, schools in urban areas had higher accelerated learning participation rates than schools in rural and suburban areas.

Nearly all public high schools in Oregon had at least one student taking accelerated learning (figure 1).

Figure 1. Ninety-seven percent of Oregon public high schools had at least one student taking accelerated learning in 2015/16



Note: Sample size is 325 public schools with students in grades 9–12 in 2015/16.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

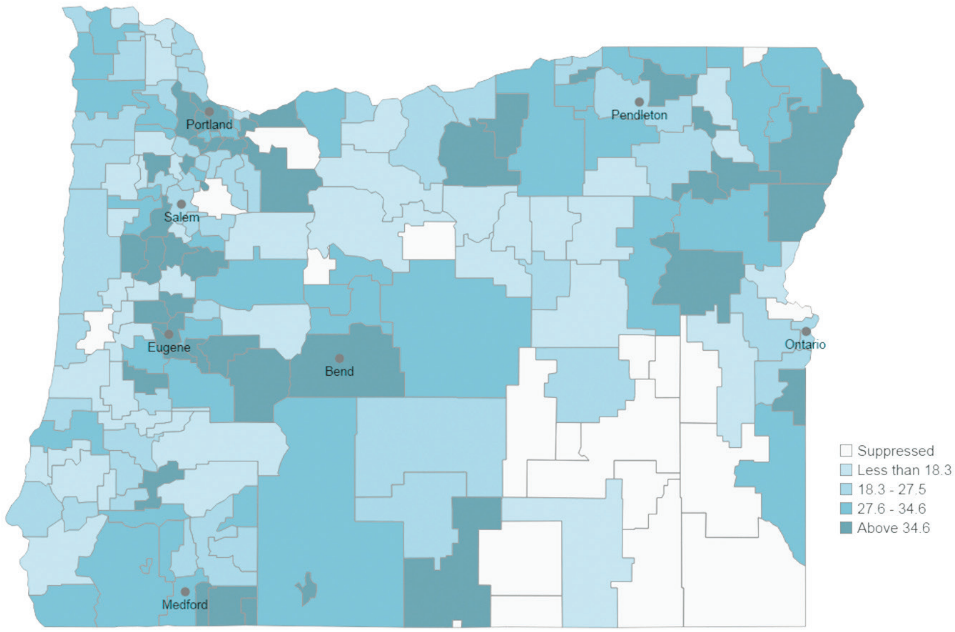
Within a high school, on average, in 2015/16, 28 percent of students took any accelerated learning, 16 percent took dual credit, 7 percent took direct enrollment, 9 percent took AP courses, and 2 percent took IB courses (table A2 in appendix A). The authors also examined the percentage of schools with no, low, and moderate to large school-level participation in each accelerated learning model to understand how pervasive it was across schools in the state. The authors defined low participation as 5 percent or fewer students participating in the accelerated learning model and moderate to large participation rates as more than 5 percent of students participating in the accelerated learning model. This analysis revealed that low school-level participation rates were most common for direct enrollment; in 2015/16, in more than half of high schools, 5 percent or fewer of students took a direct-enrollment class. Moderate to large school-level participation rates were most common for dual credit; in 2015/16, in 72 percent of high schools, more than 5 percent of students took a dual-credit class (table A2 in appendix A).

While a lower percentage of students took direct-enrollment courses compared with dual-credit courses, direct enrollment was represented in many more schools because fewer students within each school participated in this accelerated learning model. A small number of students within a school may be taking direct-enrollment courses because individual students can take college courses at the campus or online. Additionally, schools with smaller student enrollments are more likely to have students taking direct enrollment (see next section).

Examining participation rates by locale reveals that schools in urban locations had higher accelerated learning participation rates (on average, in 2015/16, 36 percent of students in a school participated) than schools in rural and suburban locations (26 percent and 32 percent, respectively). These differences were largely driven by differences in AP and IB participation; schools in urban locations had higher AP participation (on average, in 2015/16, 11 percent of students took an exam, and 18 percent took a course) and IB participation (9 percent took a course) than schools in rural locations (4 percent took an AP exam, 8 percent took an AP course, and 0.4 percent took an IB course). On the other hand, there were small differences in the average percent of students who took dual-credit (17 percent in urban schools and 18 percent in rural schools), dual-credit CTE (6 percent in urban schools and 7 percent in rural schools), and direct-enrollment (4 percent in urban schools and 6 percent in rural schools). (Detailed findings on participation rates by student groups and school locale are in table A3 in appendix A.)

To address participation rates by geographic region of the state, the map below (figure 2) displays variation in rates of accelerated learning participation across school districts in Oregon. Many of the districts in the top quartile of participation rates (34.6 percent of high school students in the district participating or higher; indicated by the darkest blue shade) are concentrated in or near the cities of Portland, Salem, Eugene, Bend, and Medford in part because schools in urban areas had higher AP and IB participation. (Figures A1–A3 in appendix A display districts' rates for each accelerated learning model.)

Figure 2. Accelerated learning participation rates varied by district (2015/16)



Note: Each area outlined in the map represents the boundaries for a school district. School district accelerated learning participation rates for 2015/16 were divided into quartiles and each color represents a quartile. Districts colored in darker shades had higher participation rates. Suppressed means fewer than 10 students participated in that district.

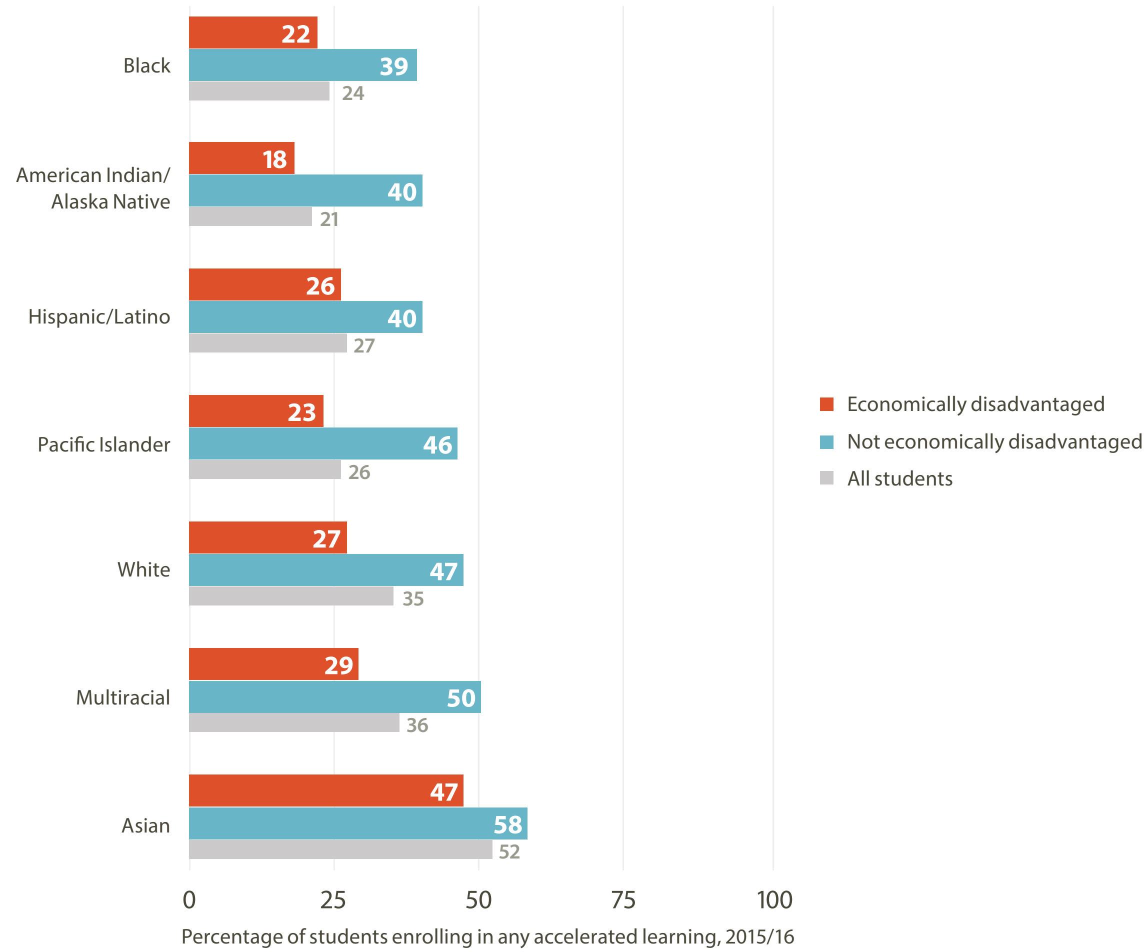
Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

Students who were economically disadvantaged were less likely to participate in accelerated learning compared to their peers who were not economically disadvantaged. Similarly, schools with a higher percentage of economically disadvantaged students had lower participation rates in accelerated learning.

For individual students, economic disadvantage had the largest negative association with accelerated learning participation compared to all other demographic and achievement factors. This finding is in line with prior research, both in Oregon and nationally, which has found that students who are economically disadvantaged are less likely than their peers to engage in accelerated learning opportunities (Estacion, Cotner, D'Souza, Smith, & Borman, 2011; Pierson, Hodara, & Luke, 2017). Within a high school, students who were ever economically disadvantaged were 12 percentage points less likely to take an accelerated learning course in high school than their counterparts in that same high school who were not economically disadvantaged (after accounting for gender, race, achievement, English learner status, IEP status, attendance, discipline incidences, and mobility). This pattern holds when comparing the likelihood of participation across the state; students who were ever economically disadvantaged were 11 percentage points less likely to take an accelerated learning course in high school than their counterparts across high schools in Oregon who were not economically disadvantaged. (Detailed regression results for these findings are in table A5 in appendix A.)

Gaps in participation for students who were and were not economically disadvantaged were largest for Pacific Islander and urban students. Among racial/ethnic groups, the gaps in accelerated learning participation ranged from 11 percentage points among Asian students to 23 percentage points among Pacific Islander students (figure 3). Among school locations, the gaps in accelerated learning participation ranged from 15 percentage points among students in rural schools to 24 percentage points among students in urban schools (figure 4).

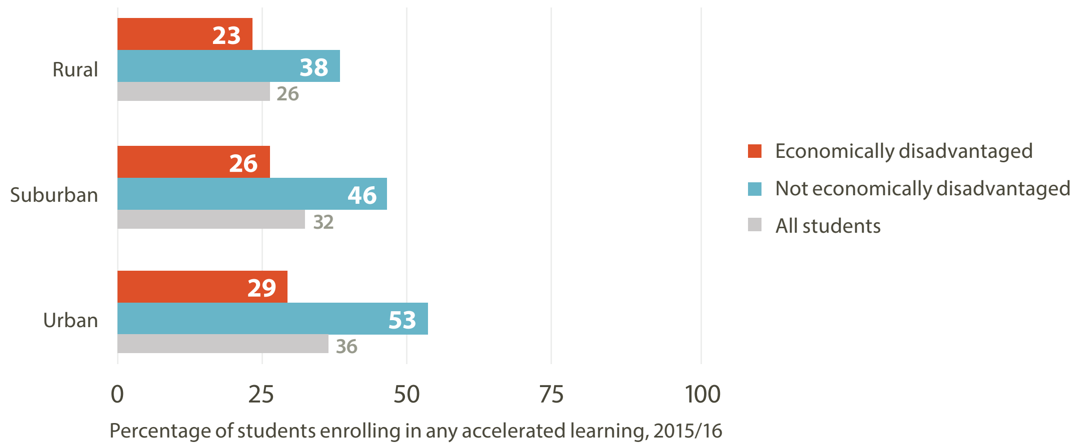
Figure 3. The accelerated learning participation gap between students who were and were not economically disadvantaged was largest for Pacific Islander students in 2015/16



Note: Sample includes 190,080 public high school students in 2015/16: 4,859 Black; 5,459 American Indian/Alaska Native; 45,228 Hispanic/Latino; 1,167 Pacific Islander; 118,266 White; 7,523 Multiracial; and 7,578 Asian.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

Figure 4. The accelerated learning participation gap between students who were and were not economically disadvantaged was largest for urban schools in 2015/16



Note: Sample includes 181,837 public high school students in 2015/16, with 63,023 attending a high school in an urban area, 77,015 in a suburban area, and 41,799 in a rural area. In 2015/16, 8,243 students attended a public high school with a missing locale code and are not included in this figure.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

Regarding predictors of a high school's accelerated learning participation rate, a higher percentage of students who were ever economically disadvantaged in a school was related to lower participation rates in accelerated learning overall, when accounting for other school characteristics (size, location, type, and student demographics and achievement levels). Being a suburban or rural school was also related to a lower accelerated learning participation rate after accounting for other school characteristics. These findings are in line with national research that has found that lower-income, smaller, and/or rural schools tend to have lower participation because they may lack the capacity or resources to offer accelerated learning programs (Klopfenstein & Lively, 2012; Thomas, Marken, Gray, & Lewis, 2013). Study findings may be driven by AP coursetaking participation, since a higher percentage of students who were ever economically disadvantaged in a school was related to lower AP coursetaking rates and was not related to dual-credit and direct-enrollment rates. (Detailed regression results for these findings are in table A4 in appendix A.)

In contrast to previous research, accounting for other school characteristics, school size was not related to the overall accelerated learning, dual-credit participation, and AP coursetaking rates, but larger schools tended to have lower direct-enrollment rates (and conversely, smaller schools had higher direct-enrollment rates).

Box 2. Equity in accelerated learning access across racial/ethnic groups and case study of Regional Promise

In 2012, Eastern Oregon developed the Eastern Promise sponsored dual-credit model to expand access to accelerated learning in rural schools that did not have teaching staff with a master's degree in the subject area (typically needed to offer dual credit). Based on the success of Eastern Promise, beginning in 2014/15, through a competitive grant program, the Oregon State Legislature awarded Regional Promise grants to regional groups of school districts, education service districts, and local postsecondary institutions to increase the number of dual credit courses available in these areas and to expand access to historically underrepresented groups of students (Pierson & Hodara, 2016).

The Regional Promise grants are used to expand access to accelerated learning mainly by offering sponsored dual credit and assessment-based learning courses. Across Oregon, 8 percent of students took a Regional Promise grant-funded course in 2014/15, and 6 percent of students took a Regional Promise grant-funded course in 2015/16 (Pierson & Hodara, 2018). The grant has an explicit focus on equity, and schools work to improve accelerated learning access to historically underrepresented students by, for example, increasing school staff members' cultural competency and providing culturally responsive supports to students and their families. Grant funds are also used to promote a college-going culture, form cross-sector professional learning communities of high school teachers and postsecondary faculty members, improve career exploration and guidance systems, and build cross-sector collaboration.

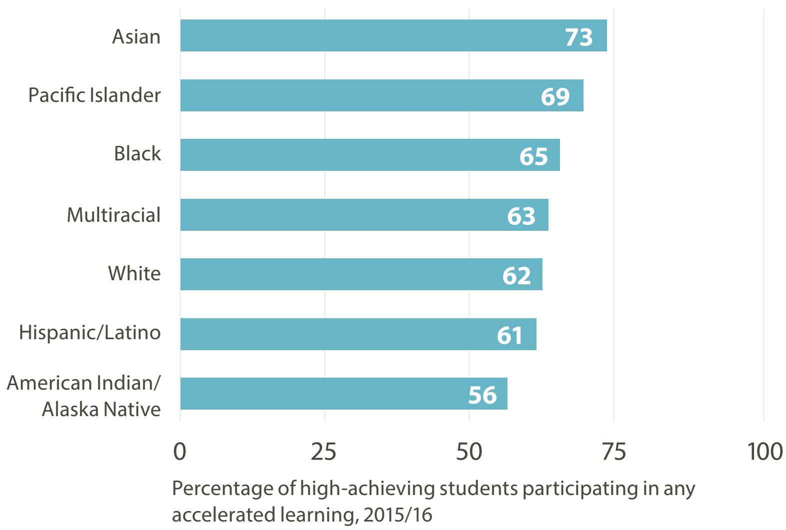
Regional Promise courses appear to have a broader reach to historically underrepresented student groups—as intended—compared with AP, IB, dual credit, and direct enrollment. As with other types of accelerated learning, students who are economically disadvantaged are less likely to take a Regional Promise grant-funded accelerated learning course than students who are not economically disadvantaged. However, unlike other types of accelerated learning, race/ethnicity does not appear to have a relationship with Regional Promise course participation. For example, Pacific Islander students were 3 percentage points less likely and American Indian/Alaska Native students were 4 percentage points less likely to take accelerated learning than their White peers. Hispanic/Latino students were about 1 percentage point less likely to participate in dual credit or direct enrollment compared to their White peers. In contrast, White students and students of color had the same likelihood of taking a Regional Promise grant-funded course in Regional Promise schools. See table A5 in appendix A for results.

Predictors of participation in accelerated learning were the same as predictors of graduating from high school—and they can be traced to middle school. Specifically, malleable measures of achievement and engagement in middle school (assessment scores, attendance, discipline, and school mobility) were consistently related to accelerated learning participation.

Meeting or exceeding state standards on the math and reading assessments in grade 8 was a consistent predictor of accelerated learning participation across all models (see table A5 in appendix A). Students who met or exceeded state standards were 27 percentage points more likely to enroll in some form of accelerated learning in high school. The relationship between middle school achievement and high school accelerated learning participation was strongest for AP course/exam-takers and dual-credit participants. Students who met or exceeded state standards were 17 percentage points more likely to take an AP course and/or exam and 15 percentage points more likely to participate in dual credit. The relationship between middle school achievement and high school accelerated learning participation was lowest for direct enrollment (3 percentage points more likely to participate).

Overall, high-achieving (i.e., students scoring in the top quartile on the math and reading state assessment) American Indian/Alaska Native high school students were less likely to participate in accelerated learning than all other groups of high-achieving students. For instance, 56 percent of American Indian/Alaska Native high-achieving students participated in accelerated learning in 2015/16 compared with 73 percent of Asian high-achieving students (figure 5).

Figure 5. American Indian/Alaska Native high-achieving students participated in accelerated learning in 2015/16 at lower rates than high-achieving students in other racial or ethnic groups



Note: Sample includes 27,256 students in 2015/16 who scored in the top quartile on the reading and math state assessments in high school and participated in accelerated learning.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

Other predictors of accelerated learning participation emphasize the importance of factors related to academic achievement and student engagement that are also related to high school graduation. Attendance, behavior incidents (as measured by number of suspensions and expulsions), and student mobility are used as indicators of student's likelihood of graduating from high school, and attendance and behavior are also often included in early warning systems to help identify students at risk of dropping out (Frazelle & Nagel, 2015; Rumberger & Larson, 1998). These indicators also proved to be relevant for accelerated learning participation. Consistent across accelerated learning models, discipline incidences and school mobility had a negative relationship with accelerated learning participation. Accounting for student background characteristics, each time a student changed schools in middle school was related to a 4 percentage point decrease in accelerated learning participation in high school, and each additional suspension or expulsion in middle school was related to a 3 percentage point decrease in accelerated learning participation in high school.

Higher average annual attendance rates predicted higher school-level overall accelerated learning and dual-credit participation rates. At the student level, after accounting for background characteristics and achievement, a 1 percentage point increase in a student's average annual attendance rate in middle school was related to a 5 percentage point increase in their likelihood of dual-credit participation. However, higher attendance in middle school was negatively related to AP course and/or exam participation and direct-enrollment participation.

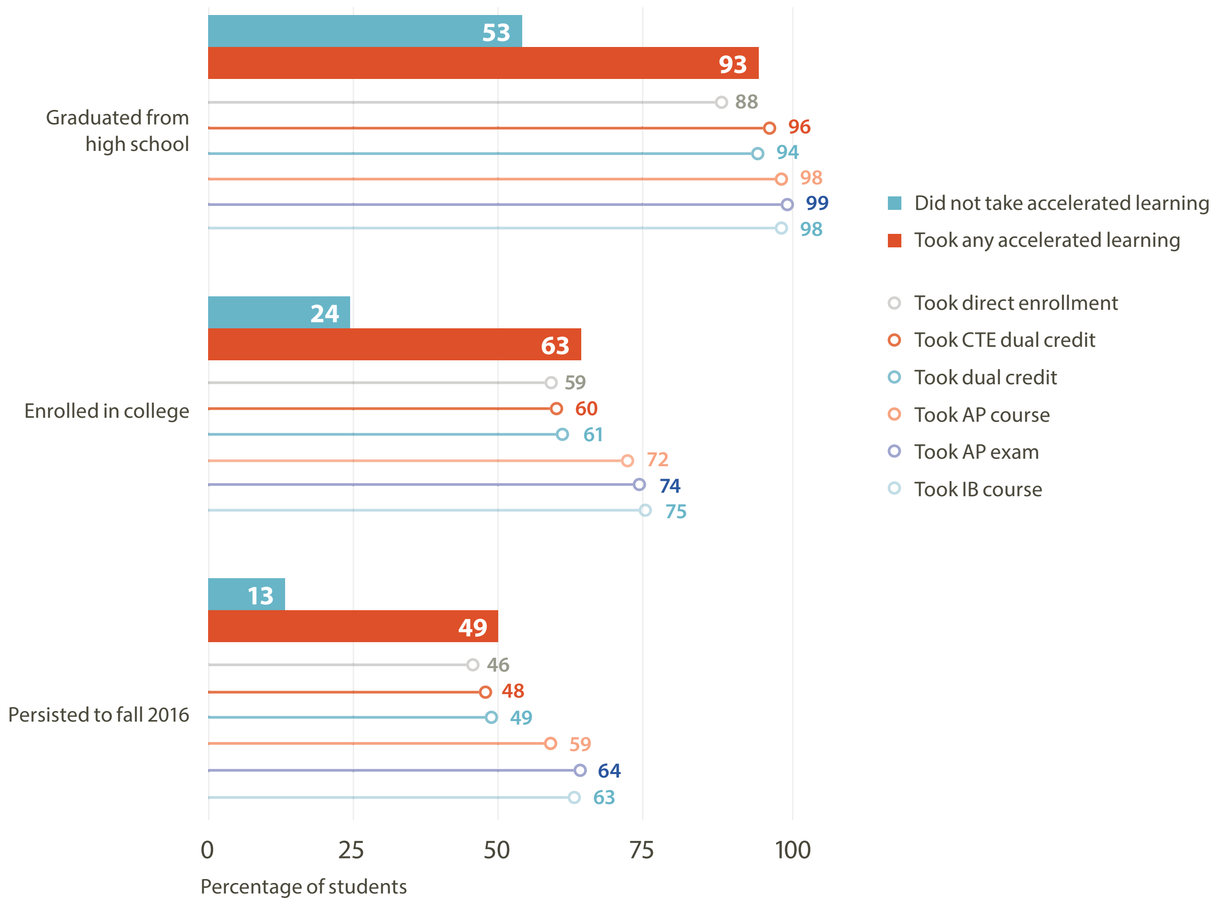
Finally, related to measures of achievement, across all models of accelerated learning, special education and English learner status had a mixed association with accelerated learning participation. Accounting for student background characteristics, the percentage of students at a school with an IEP was associated with lower schoolwide rates of accelerated learning participation, and students who had an IEP in elementary or middle school were 9 percentage points less likely to enroll in accelerated learning in high school. Similarly, current English learners receiving services in high school were 11 percentage points less likely to participate in accelerated learning compared to non-English learners. On the other hand, former English learners who received English learner services any time during K-8 but not in high school were 7 percentage points more likely to participate in accelerated learning compared to non-English learners.

FINDINGS: HIGH SCHOOL-TO-COLLEGE OUTCOMES

In the class of 2014/15, accelerated learning participants were 30 percentage points more likely to graduate from high school, 25 percentage points more likely to enroll in college, and 22 percentage points more likely to persist in college than similar peers who did not take accelerated learning in high school. Findings were consistent for Black, Latino/Hispanic, and American Indian/Alaska Native students.

Overall, 93 percent of students who participated in accelerated learning graduated from high school compared with 53 percent of students who did not participate (a 40 percentage point difference), 63 percent enrolled in college compared with 24 percent of students who did not participate (a 39 percentage point difference), and 49 percent were still in college in fall 2016 compared with 13 percent of students who did not participate (a 36 percentage point difference) (figure 6). Students who took AP courses, AP exams, and IB courses had the highest outcomes, followed by students who took dual-credit courses and then by students who took direct-enrollment courses.

Figure 6. Among Oregon public high school students in the class of 2014/15, accelerated learning participants had higher high school graduation, college enrollment, and college persistence outcomes than students who did not take accelerated learning



Note: Population includes 44,907 public high school students who were freshmen in 2011/12. Student outcomes were tracked to fall 2016. "Graduated from high school" is from ODE data. "College enrollment" and "college persistence" are from NSC data. Categories of accelerated learning types are not mutually exclusive; students who take multiple types are represented in multiple categories.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, College Board, and National Student Clearinghouse.

Differences in student outcomes illustrated in figure 6 could be driven by differences in students who participated in accelerated learning and students who did not. Thus, further analysis was conducted on students in the class of 2014/15 who participated in accelerated learning (or a specific accelerated learning model) and a matched sample of students who did not participate in accelerated learning but were similar to accelerated learning participants based on the following background characteristics: gender, race/ethnicity, ever eligible for free or reduced-price lunch, former English learner, current English learner, ever had an IEP, number of days expelled or suspended (in-school or out-of-school suspension) in middle school, average attendance rate in middle school, number of middle schools attended, and met or exceeded standards on state math and reading assessments in grade 8. The sample includes students who only took that type of accelerated learning (dual credit, CTE dual credit, direct enrollment, or AP course and/or exam) and students who did not take any accelerated learning to better isolate the unique contribution of that accelerated learning type on outcomes.[1] (This analysis excludes IB because IB course data were available only for students' senior year.) The analysis was "doubly robust" in that the study team matched students and then used regression analysis to further control for the contribution of background characteristics and the high school that the student attended on education outcomes.

This analysis found that students in the class of 2014/15 who enrolled in any form of accelerated learning during high school were 30 percentage points more likely to graduate from high school, 25 percentage points more likely to enroll in college, and 22 percentage points more likely to persist in college to fall 2016 than their matched peers who did not take accelerated learning courses in high school. (Detailed regression results are in table B3 in appendix B.)

The relationship between accelerated learning participation and outcomes was similar for Black, Hispanic/Latino, and American Indian/Alaska Native students (table B4). However, there is a larger relationship with high school graduation for American Indian/Alaska Native accelerated learning students, who were 47 percentage points more likely to graduate from high school than American Indian/Alaska Native students who did not participate in accelerated learning.

The positive association between accelerated learning and education outcomes varied in magnitude based on accelerated learning model.

Examining the relationship between specific accelerated learning models and outcomes, AP exam and course participation appeared to have the largest association with positive education outcomes: AP students were 40 percentage points more likely to graduate from high school than matched peers who did not take any accelerated learning and 35 percentage points more likely to enroll in college, and 29 percentage points more likely to persist in college (figure 7).

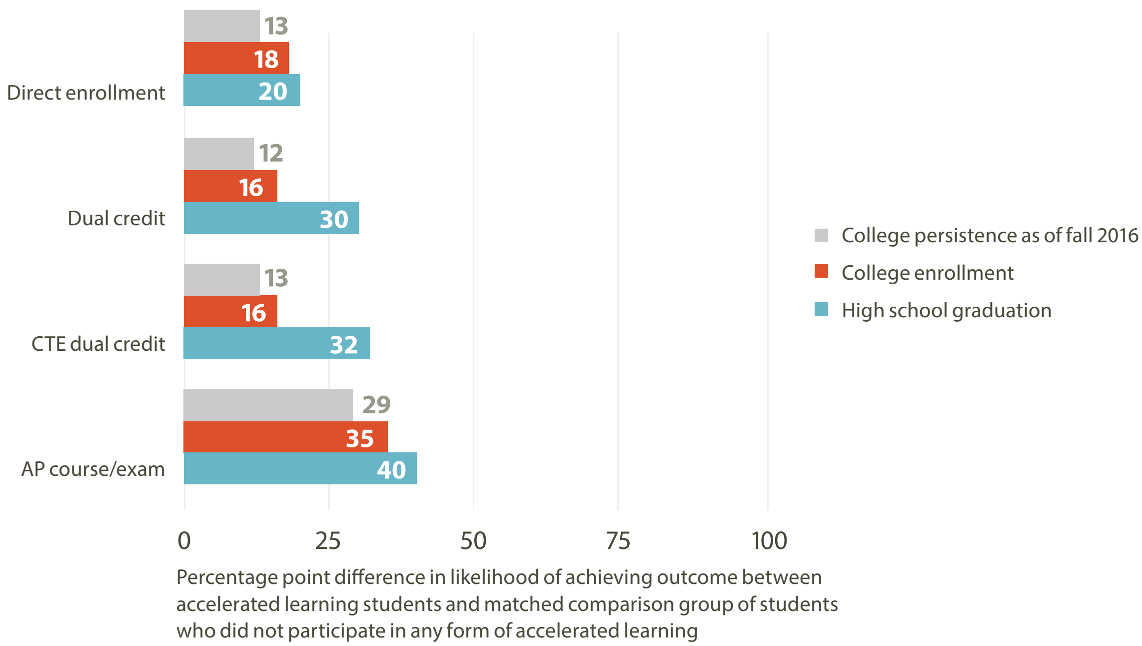
CTE dual credit had a slightly larger association with high school graduation and a similar association with college enrollment and persistence compared with any dual-credit course; students who took CTE dual-credit courses were 32 percentage points more likely to graduate from high school than similar students who did not take any accelerated learning, and students who took dual-credit courses were 30 percentage points more likely to graduate from high school than matched peers who did not take any accelerated learning. Students who took CTE dual credit or any type of dual

[1]Findings related to the relationship between Regional Promise and attendance, high school graduation, and college enrollment are reported in Pierson and Hodara (2018).

credit were around 16 percentage points more likely to enroll in college compared to similar students who did not take any accelerated learning and 12 to 13 percentage points more likely to persist in college compared with their matched peers who did not take any accelerated learning.

Direct-enrollment participation did not have as large of a relationship with high school graduation as the other models, although direct enrollment has the same relationship with postsecondary outcomes as dual credit. Compared to their matched peers who did not take any accelerated learning, direct enrollment participants were 20 percentage points more likely to graduate from high school, 18 percentage points more likely to enroll in college, and 13 percentage points more likely to persist in college.

Figure 7. All accelerated learning models were related to a greater likelihood of graduating from high school and enrolling and persisting in college for students in the class of 2014/15



Note: The numbers in figure 7 represent marginal effects—the difference in the predicted probability of the accelerated learning students and matched comparison group of non-participants achieving the outcome. The sample was drawn from the population of 44,907 public high school students who were freshmen in 2011/12. Student outcomes were tracked to fall 2016. "Graduated from high school" is from ODE data. "College enrollment" and "college persistence" are from NSC data. All coefficients were statistically significant. See table B3 in appendix B for full regression results.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, College Board, and National Student Clearinghouse.

Differences in the magnitude of the relationship between accelerated learning models and outcomes may be due to unobserved variables. For example, AP students may have much higher grades and parental support than other accelerated learning students, which may be driving their higher outcomes. Differences may also be due to different mechanisms underlying accelerated learning types. For example, although accelerated learning programs tend to focus on college preparation, CTE dual credit also has an explicit focus on improving high school graduation (Oregon Department of Education, n.d.). Additionally, direct enrollment may have a smaller relationship with high school graduation but a similar relationship across postsecondary outcomes compared to other types because it provides students with a direct experience on college campuses, but it is not necessarily a structured program in high schools with an explicit focus on high school success.

Overall, this analysis comparing outcomes of accelerated learning participants and a matched sample of students should be interpreted with caution because the study team was not able to control for all variables that determine accelerated learning participation, such as student motivation, academic criteria that may determine eligibility to take accelerated learning, and parental support and education, which could also contribute to differences in outcomes between accelerated learning participants and similar students who do not participate. Thus, this analysis does not prove a causal link between accelerated learning and student outcomes. See appendix B for more information about the methods, data that demonstrate the similarities in background characteristics between the treatment and comparison groups, and detailed regression results.

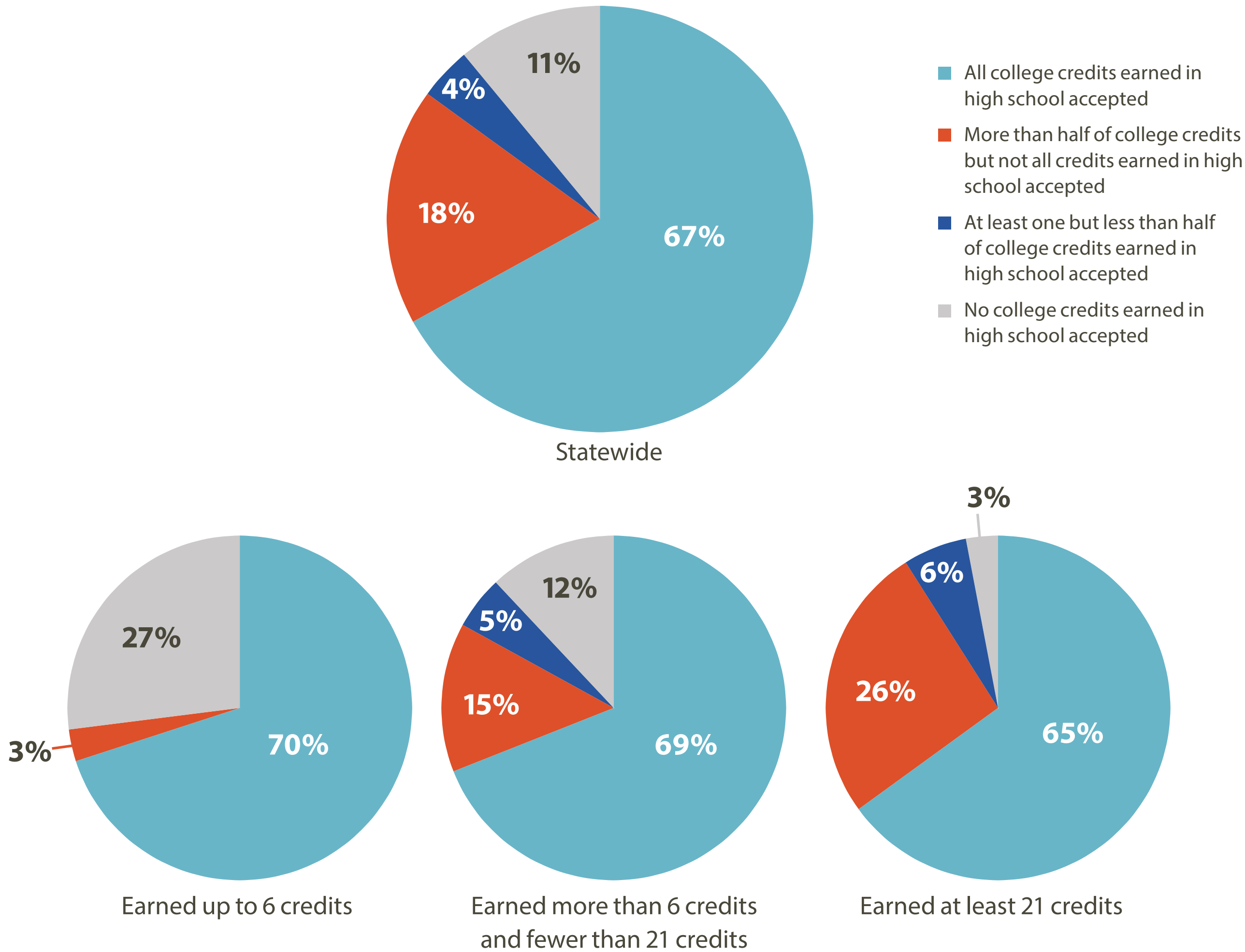
FINDINGS: ACCELERATED LEARNING CREDIT TRANSFER

Overall, 15 percent of students in the class of 2014/15 transferred less than half the credits they earned in high school to the Oregon public university they attended after high school.

Although accelerated learning participation is related to increases in high school graduation, college enrollment, and college persistence, stakeholders in Oregon and across the country are concerned about challenges to a key purported benefit of accelerated learning—the transfer of college credits earned in high school to the postsecondary institution students enter after high school. The authors examined the proportion of college credits students in the class of 2014/15 who entered an Oregon public university in 2015/16 earned in an accelerated learning program that were subsequently accepted by a university. This analysis is based on a data field "transfer credits accepted" that Oregon public universities collect but is not collected by Oregon community colleges. See appendix C for more details on the methods and findings.

Overall, 67 percent of students in the class of 2014/15 who earned college credit in high school and entered an Oregon public university in 2015/16 transferred all college credits earned. On the other hand, for 11 percent of students who earned college credit in high school, no credits were accepted, and 4 percent of students transferred at least one but less than half of their credits (figure 8). A higher proportion of students who earned credit from up to two courses (i.e., no more than six credits) did not transfer any credits compared with students who earned more credit in high school. More than 90 percent of students who earned 21 or more credits transferred most of their credits to the university they attended after high school.

Figure 8. Over two-thirds of students in the class of 2014/15 transferred all college credits earned in high school to the Oregon public university they attended after high school



Note: Statewide sample includes 4,030 students in the class of 2014/15 who earned credit from dual credit, direct enrollment, and/or AP exams in high school and enrolled in an Oregon public university in 2015/16. The mean number of credits earned in high school is 21 credits. Overall, 728 students earned up to six credits, 1,657 students earned more than six and fewer than 21 credits, and 1,645 students earned between 21 and 148 credits.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

Among students in the class of 2014/15, three factors were related to the proportion of college credits earned in high school that were accepted at a university after high school: Students who were economically disadvantaged had a lower rate of transfer credits accepted; students who were high achievers had a higher rate of transfer credits accepted; and compared to students who attended urban high schools, students who attended suburban and rural high schools had lower rates of transfer credits accepted. (Detailed regression results are in table C4 in appendix C.)

There was wide variation in the credit transfer rate across universities; at one university, 82 percent of students had all college credits from high school accepted, while at another university, only

43 percent of students had all college credits from high school accepted. However, the university a student attended after high school was not related to that student's credit transfer rate (as evidenced by the insignificant coefficients on the indicators of university in the regression models). This suggests variation in rates of transfer credits accepted across universities may be due in part to differences in their student populations. At universities with lower average rates of transfer credits accepted (i.e., where between 43 and 62 percent of students transferred all college credits earned in high school), 71 percent of the class of 2014/15 that attended these universities in 2015/16 were eligible for free or reduced-price lunch in grades K–12, and 22 percent were in the top quartile on the math and reading assessments in high school. On the other hand, at universities with higher average rates of transfer credits accepted (i.e., where at least 78 percent of students transferred all college credits earned in high school), 45 percent of students in the class of 2014/15 who attended these universities in 2015/16 were eligible for free or reduced-price lunch in grades K–12, and 55 percent were in the top quartile on the math and reading assessments in high school.

Nearly 25 percent of students in the class of 2014/15 who earned credit from dual-credit math in high school and 9 percent of students who earned credit from dual-credit English in high school took the same course or a lower-level course at the Oregon public community college or university they attended after high school.

The two most popular dual-credit subject areas in Oregon are dual-credit math (for example, College Algebra, or Math 111) and dual-credit English (for example, English Composition, or Writing 121). Among dual-credit takers in the class of 2014/15, 30 percent took a dual-credit math course and 27 percent took a dual-credit English course. The next most popular subject area was science, with 16 percent of students taking a dual-credit science course.

Taking dual-credit college math and English presumably allows students to complete courses in high school that are key prerequisites for many postsecondary programs; yet this does not seem to be the case for many Oregon students. The most common coursetaking outcome for students who earned credit in dual-credit college math in high school was to take a math course with a higher course number (33 percent of students), followed by taking no math (28 percent of students), presumably because they did not need any more math in college. However, 24 percent of students who earned credit for dual-credit college math took a course with a lower course number or the same course in their first year at community college or university, and a quarter of these students (representing 118 students) took a developmental math course after earning credit in a dual-credit college math course in high school. Finally, 15 percent of students who earned credit in dual-credit math in high school and entered college in 2015/16 did not take any math courses and were no longer enrolled in college as of fall 2016 (figure 9).

Taking the same or lower level English course was much less common. Only 9 percent of students who earned credit for dual-credit college English composition took a course with a lower or same course number in their first year at community college or university. The most common coursetaking outcome for students who earned credit in dual-credit English composition in high school was to take no English composition (45 percent of students), presumably because they did not need any more English composition courses in college. In addition, 26 percent of students took an English composition course with a higher course number, and 20 percent of students who enrolled in college in 2015/16 did not take any English courses and were no longer enrolled in college as of fall 2016 (see figure 9).

Figure 9. Some students in the class of 2014/15 who earned credit from dual-credit math and English took the same course or a lower-level course at the public university or community college they attended in 2015/16

24%

took the same or lower math course than they took in high school

- **15%** did not take course in subject, no longer enrolled as of fall 2016
- **18%** took lower-level course than dual-credit course
- **6%** took same-level course as dual-credit course
- **33%** took higher-level course than dual-credit course
- **28%** did not take course in subject, still enrolled as of fall 2016

9%

took the same or lower English course than they took in high school

- **20%** did not take course in subject, no longer enrolled as of fall 2016
- **4%** took lower-level course than dual-credit course
- **5%** took same-level course as dual-credit course
- **26%** took higher-level course than dual-credit course
- **45%** did not take course in subject, still enrolled as of fall 2016

Note: Sample includes 2,790 students in the class of 2014/15 who earned credit from dual-credit math in high school and 2,659 students in the class of 2014/15 who earned credit from dual-credit English in high school and enrolled in an Oregon public university or community college in 2015/16.

Source: Authors' analysis of data from the Oregon Department of Education and Higher Education Coordinating Commission.

Among students who earned credit in dual-credit college math, there were five key predictors of whether they would take the same or a lower-level course in college (table C4). Compared to White students, Hispanic/Latino students were 10 percentage points and Black students were 34 percentage points more likely to take the same or a lower-level math course in college compared with their dual-credit math course. In addition, compared with students from urban high schools, students from suburban high schools were 7 percentage points more likely to take the same or a lower-level math course in college compared to their dual-credit math course. On the other hand, high achievers were 13 percentage points less likely to take the same or a lower math course in college compared to their dual-credit math course. The most common highest-level dual-credit math course this group of students took in high school was trigonometry (Math 112). Compared to students who took dual-credit trigonometry (Math 112), students who took all other math courses, except Math 106, were more likely to take the same or a lower math course in college compared to their dual-credit math course.

Among students who earned credit in dual-credit English, no student characteristics were related to taking the same or a lower-level course in college. Instead, key predictors included where students took their dual-credit course and where they attended college after high school. Students who took dual-credit English from a university were more likely to take the same or a lower level course in college than students who took dual-credit English from a community college.

CONSIDERATIONS FOR FURTHER INVESTIGATION: IMPROVING ACCELERATED LEARNING ACCESS AND OUTCOMES

Accelerated learning participation is increasing in Oregon, and although this study cannot prove there is a direct link between accelerated learning and student outcomes in Oregon the findings demonstrate that accelerated learning is associated with higher rates of high school graduation, college enrollment, and college persistence. Below, we present important considerations for education leaders based on the data included in this report that will support the state's continued policy focus on using accelerated learning as a strategy to help students graduate from high school and successfully navigate the transition from high school to college.

Expanding access to accelerated learning

Across all student groups, student achievement in middle school is associated with the likelihood of accelerated learning participation, suggesting that improving the academic preparation of students early on—so they can take these courses in high school—is a key strategy for expanding equitable access to accelerated learning. The strong association between attendance, mobility, and discipline incidences in middle school and subsequent accelerated learning participation in high school also suggests that a focus on student engagement could expand access across all groups. Education leaders may wish to consider the following when thinking about expanding access to accelerated learning:

- Investigate factors that promote or hinder accelerated learning participation for low-income students, who are less likely to participate in all accelerated learning models—regardless of their academic achievement and engagement in middle school, as well as the high school they attend.
- Explore strategies used in Oregon and across the country that increase AP and IB course and exam offerings in both schools with more students in poverty and rural schools, which are less likely to offer these accelerated learning models. Research should also continue to investigate school characteristics that are related to offering different types and amounts of accelerated learning to inform schoolwide efforts to expand accelerated learning access.
- Pay attention to inequities in access to accelerated learning across high achievers. Statewide, American Indian/Alaska Native high achievers have the lowest rates of accelerated learning participation across all high achiever groups. Schools should examine their own data to better understand which groups of students need increased outreach and support to participate in accelerated learning and then share strategies related to effectively expanding access to historically underrepresented groups.
- Consider strategies for increasing access to accelerated learning among current English learners and students with disabilities, who are less likely to participate in accelerated learning than students who were never or former English learners or never had an IEP. According to the Office of Civil Rights, districts have an obligation to ensure current English learners have an equal opportunity to participate in advanced coursetaking programs and opportunities (Lhamon & Gupta, 2015). Similarly, the Office of Special Education views accelerated

learning models, such as dual or concurrent enrollment and early college, as key services to help students with disabilities transition to postsecondary education and employment (U.S. Department of Education, 2017). The Education Commission of the States provides strategies to help education stakeholders expand accelerated learning access to students with different achievement backgrounds (Zinth & Barnett, 2018).

Improving outcomes in accelerated learning

In 2015/16, direct-enrollment participants passed about 70 percent of the classes they took, and AP test-takers passed about half the tests they took. To begin to address the outcomes of direct-enrollment participants and AP test-takers, stakeholders may want to consider the following:

- Examine the kinds of supports that individual high school students who are directly taking college courses online or on a college campus receive and consider creating networks of peer support at the high school or college, since direct-enrollment participants are likely to be at a high school where few other students are taking direct-enrollment courses.
- Continue to examine data on the proportion of AP students who take AP exams and the proportion of exam-takers who pass to better understand the conditions or strategies that are related to increases in exam-taking and better performance on the exams.

This study provides new data on accelerated learning credit transfer in Oregon. In 2015/16, about a third of students directly entering an Oregon public university from a public high school did not transfer all college credits earned in high school, and a quarter of students directly entering an Oregon public university or community college from a public high school ended up taking the same or a lower level math course after earning credit in dual-credit college math. The following are key areas for further investigation:

- This study explored credit transfer among only public high school students attending university. Although about a third of accelerated learning participants in this cohort who attended college attended an Oregon public university, 46 percent attended a community college. Further research is needed on the credit transfer rate among accelerated learning participants who attend community college. This would provide a better understanding of the scope of credit transfer issues among all accelerated learning participants who attend college in Oregon.
- This study was not designed to examine why some students did not have all college credits earned in high school accepted, but one possibility is that some students may not have requested credit transfer due to a lack of familiarity with the process or because they do not need those credits for their chosen degree pathway. For example, according to data from the College Board reported to ODE, in 2017, 46 percent of Oregon AP exam-takers who earned a 3 or higher did not report their score(s) to the colleges they applied to (J. Ives, Oregon Department of Education, personal communication, May 14, 2018). Interviews with high school counselors and other staff members; postsecondary faculty members, advisors, and registrars; and accelerated learning students—or a statewide survey of these stakeholders—could be an important first step in understanding what information adults and students have about this process and the barriers to receiving credit for college credits earned while in high school.

- Additional research is needed to examine why economically disadvantaged accelerated learning students have lower rates of transfer credits accepted. High school and postsecondary educators and counselors/advisors may want to examine policies and practices related to advising low-income and first-generation college students and identify any implicit biases or barriers that inhibit these students from transferring the college credits they earn in high school.
- Postsecondary institutions may want to investigate whether their course-placement practices contribute to students taking the same or a lower level math or English course and how their placement practices could account for the college courses students completed in high school. The Oregon community colleges have been transforming their placement practices—from a standardized assessment to multiple measures—to place incoming students into the highest-level courses in which they are likely to succeed (Higher Education Coordinating Commission & the Oregon Department of Education, 2016). Continued research should explore whether these efforts are ensuring students who earn credit in dual-credit math and English in high school are able to fulfill their math and English program requirements or enroll in the next course in the sequence in college.

Recent developments in Oregon may improve accelerated learning credit transfer. Beginning in 2016/17, Oregon's Oversight Committee for High School-Based College Credit Partnerships (which consists of stakeholders from high schools, school districts, education service districts, community colleges, public universities, and state agencies) implemented a peer-review process for all dual credit, sponsored dual credit, and assessment-based learning credit models to ensure alignment between regular college courses and the corresponding high school-based courses (Higher Education Coordinating Commission, 2017–2018). Specifically, the peer-review process ensures the models follow standards related to curriculum, faculty, tuition and fees, assessments, and other areas. Standards regarding credit transfer require that high school students in these programs receive guidance related to the transfer of credit.

Additionally, in 2017, the Oregon State Legislature passed House Bill 2998, which requires community colleges and public universities to establish a foundational set of core courses that transfer across Oregon public higher education institutions, guaranteeing that students will not lose credits earned in these core courses.[2] The bill also requires community colleges and public universities to establish a transferable set of courses for the first two years for the most popular majors, so that community college students who complete these courses will enter universities as juniors in their major. Moving forward, it will be important to study how this bill improves credit transfer not only for postsecondary students but also for high school students who earn college credit in these transferable core and major courses.

Oregon provides large numbers of students with access to various accelerated learning opportunities, which may have a link to increased high school graduation, college enrollment, and college persistence rates. The data and evidence presented in this report will help the state determine the best ways to improve course outcomes and credit transfer, which is part of the larger effort to expand equitable access to this valuable high school learning opportunity.

[2]https://olis.leg.state.or.us/liz/2017R1/Measures/Overview/HB2998

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Appendix A: Participation in Accelerated Learning

METHODS

This study used three different analyses to understand participation in accelerated learning. First, the study team calculated frequencies and rates of accelerated learning participation of Oregon public high school students in 2013/14, 2014/15, and 2015/16. Data availability varied by year (table A1). Descriptive participation rates are displayed overall and by accelerated learning type, school districts (in maps), school (table A2), and student groups (table A3).

Table A1. Accelerated learning data availability

	Years available		
	2013/14	**2014/15**	**2015/16**
Dual credit	●	●	●
Direct enrollment	●	●	●
Regional Promise		●	●
AP course		●	●
AP exam	●	●	●
IB course		●	●

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

Second, the study team ran ordinary least-squares (OLS) linear regression models to understand he relationship between school-level characteristics and school-level accelerated learning participation rates in 2015/16. The school-level characteristics included 2015/16 measures of school size (number of students), location[3] (rural, urban, and suburban), percentage of students ever eligible for free or reduced-price lunch, percentage of students ever received English learner services percentage of students suspended or expelled that year, percentage of students scoring in the top quartile in math and the top quartile in reading in high school, annual attendance rate that year, percentage of students of color that year, and percentage of students who had an individualized education program (IEP) that year. The linear model is shown below, and results are displayed in table A4.

(1) $$AcceleratedLearningRate_s = \alpha + \beta Size_s + \beta Location_s + \beta FRPL_s + \beta EL_s + \beta Discipline_s + \beta Achievement_s + \beta Attendance_s + \beta Race_s + \beta IEP_s + \varepsilon_s$$

[3]Throughout the analyses, the study team used school location based on National Center for Education Statistic (NCES) locale codes. We grouped NCES locale codes as follows: urban (11, 12, 13); suburban (21, 22, 23, 31, 41), which includes town fringe and rural fringe locales; and rural (32, 33, 42, 43), which includes town distant, town remote, rural distant, and rural remote. For more information about these codes, please see Geverdt (2015).

Third, the study team ran logistic regression models to understand the relationship between student-level characteristics and the likelihood of accelerated learning participation in 2015/16. The student-level characteristics included indicators of gender, racial/ethnic group, that the student was ever eligible for free or reduced-price lunch during K–12, ever had an IEP during K–12, was a former or current English learner (compared with never received English learner services), the student's average annual attendance rate in middle school, number of middle schools attended, number of times suspended or expelled in middle school, an indicator of meeting or exceeding state standards in grade 8 on both the reading and math state assessment, and school location in 2015/16 (rural, urban, and suburban). An additional model included high school fixed effects (indicators of high school attended) to understand if predictors of accelerated learning remained the same within schools. The main logistic model was:

(2) $$Pr(Acceleratedlearning)_i = \alpha + \beta Gender_i + \beta Race_i + \beta FRPL_i + \beta IEP_i + \beta EL_i + \beta Attendance_i + \beta Mobility_i + \beta Discipline_i + \beta Achievement_i + \beta Schoollocation_i + \varepsilon_i$$

Logistic regression models produce odds ratio coefficients. To ease the interpretation of the coefficient estimates, the study team translated the odds ratios into marginal effects. The marginal effect is the difference in the predicted probability of achieving the outcome associated with a given predictor. This study reports the marginal effect estimates, not the odds ratios.

FINDINGS

Table A2. Accelerated learning school-level percentages (2013/14 to 2015/16)

	2013/14	2014/15	2015/16
Any accelerated learning			
Mean school-level percentage of students	21.0	26.7	27.7
School-level percentage range (minimum and maximum)	0–100	0–100	0–100
Percentage of schools with no, low, or moderate to large student participation in accelerated learning			
Percentage of schools with no students	5.8	2.5	3.4
Percentage of schools with 5 percent or fewer students	11.2	7.7	6.4
Percentage of schools with more than 5 percent of students	83.0	89.9	90.2
Dual credit			
Mean school-level percentage of students in dual credit	13.3	14.8	15.8
School-level percentage range (minimum and maximum)	0–100	0–72	0–68
Percentage of schools with no, low, or moderate to large student participation in dual credit			
Percentage of schools with no students	22.7	19.6	16.9
Percentage of schools with 5 percent or fewer students	12.4	12.0	11.3
Percentage of schools with more than 5 percent of students	64.8	68.4	71.8
Direct enrollment			
Mean school-level percentage of students in direct enrollment	6.2	6.6	7.0
School-level percentage range (minimum and maximum)	0–100	0–96	0-92
Percentage of schools with no, low, or moderate to large student participation in direct enrollment			
Percentage of schools with no students	11.2	5.8	8.6
Percentage of schools with 5 percent or fewer students	54.2	55.5	53.1
Percentage of schools with more than 5 percent of students	34.5	38.7	38.3

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	2013/14	2014/15	2015/16
AP course			
Mean school-level percentage of students in AP	N/A	9.4	9.3
School-level percentage range (minimum and maximum)	N/A	0–100	0–99
Percentage of schools with no, low, or moderate to large student participation in AP			
Percentage of schools with no students	N/A	35.6	33.4
Percentage of schools with 5 percent or fewer students	N/A	18.4	19.9
Percentage of schools with more than 5 percent of students	N/A	46.0	46.6
IB course			
Mean school-level percentage of students in IB	N/A	2.0	2.4
School-level percentage range (minimum and maximum)	N/A	0–74	0–100
Percentage of schools with no, low, or moderate to large student participation in IB			
Percentage of schools with no students	N/A	79.8	77.9
Percentage of schools with 5 percent or fewer students	N/A	13.5	14.1
Percentage of schools with more than 5 percent of students	N/A	6.7	8.0

N/A indicates no data were available in that year for the designated accelerated learning type.

Note: The authors defined no participation as no students in the school enrolled in that type of accelerated learning course, low participation as greater than 0 percent but less than or equal to 5 percent of students in the school enrolled in that type of accelerated learning course, and moderate to large participation as more than 5 percent of students in the school enrolled in that type of accelerated learning course. Sample includes 330 schools in 2013/14, 326 schools in 2014/15, and 326 schools in 2015/16.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

Table A3. Student characteristics of the Oregon high school population and the percentage of each demographic group that participated in each accelerated learning type (2013/14 to 2015/16)

Panel A. Percentage of high school population from student group and percentage of student group that took accelerated learning

	Percent of students in high school population			Percent of student group that took accelerated learning		
	2013/14	**2014/15**	**2015/16**	**2013/14**	**2014/15**	**2015/16**
Male	51.7	51.7	51.6	19.8	27.1	29.1
Female	48.3	48.3	48.4	26.1	35.3	36.8
White	64.0	63.1	62.2	25.0	33.0	34.6
Multiracial	3.4	3.7	4.0	24.5	33.9	36.2
Hispanic/Latino	22.5	23.1	23.8	16.7	24.9	27.0
Asian	3.9	3.9	4.0	35.4	49.2	51.9
Pacific Islander	0.6	0.6	0.6	14.9	23.0	26.3
Black	2.6	2.6	2.6	13.3	21.8	24.0
American Indian/Alaska Native	3.0	3.0	2.9	14.6	20.7	20.6
Never economically disadvantaged (K–12)	31.9	31.0	30.9	34.1	45.0	47.0
Ever economically disadvantaged (K–12)	68.1	69.0	69.1	17.6	24.8	26.5
Never English learner (K–12)	83.0	82.2	81.8	23.9	31.9	33.6
Ever English learner (K–12)	17.0	17.8	18.2	17.4	26.9	29.5
Never had an IEP (K–12)	76.8	76.3	76.3	26.2	35.6	37.5
Ever had an IEP (K–12)	23.2	23.7	23.7	11.7	16.5	17.7
High achiever on state reading and math assessments in high school	24.7	23.8	22.3	43.8	58.8	62.6
Attended high school in urban area	33.2	33.4	36.7	22.7	35.9	36.3
Attended high school in suburban area	40.6	40.5	44.1	24.3	31.4	32.3
Attended high school in rural area	21.7	21.8	24.2	22.5	26.6	25.8

Panel B. Percentage of student group that took dual credit

	Dual credit			Community college dual credit			CTE dual credit (subset of community college dual credit)			University dual credit		
Student group	**2013/14**	**2014/15**	**2015/16**	**2013/14**	**2014/15**	**2015/16**	**2013/14**	**2014/15**	**2015/16**	**2013/14**	**2014/15**	**2015/16**
Male	12.7	14.2	15.8	11.5	12.8	14.0	5.4	5.5	5.9	1.6	2.0	2.7
Female	17.3	19.6	20.9	15.6	17.5	18.5	6.4	6.7	6.7	2.4	3.2	3.8
White	16.5	18.3	19.6	14.9	16.3	17.5	6.4	6.6	6.9	2.3	2.9	3.4
Multiracial	14.8	17.1	19.5	13.5	15.4	17.2	5.3	5.0	6.0	1.9	2.4	3.5
Hispanic/Latino	11.2	12.9	14.6	10.4	11.7	12.8	5.0	5.0	5.4	1.1	1.8	2.6
Asian	20.1	23.7	26.8	16.8	20.8	22.6	6.5	7.4	7.5	4.3	4.2	6.1
Pacific Islander	10.2	11.8	12.9	9.0	11.2	11.7	3.5	3.8	4.4	1.7	0.9	1.8
Black	8.5	11.0	12.0	7.3	9.8	10.2	2.7	3.0	2.9	1.5	1.5	2.2
American Indian/ Alaska Native	10.3	12.4	12.1	9.3	11.1	11.1	3.8	4.4	3.6	1.4	1.9	1.5
Never economically disadvantaged (K–12)	21.3	23.3	25.3	18.9	20.4	22.0	7.4	7.6	8.2	3.4	4.3	5.1
Ever economically disadvantaged (K–12)	11.9	13.9	15.1	10.9	12.7	13.6	5.1	5.4	5.5	1.4	1.8	2.4
Never English learner (K–12)	15.7	17.4	18.8	14.1	15.5	16.7	6.0	6.2	6.5	2.2	2.8	3.3
Ever English learner (K–12)	11.4	14.1	16.0	10.5	12.8	13.9	5.1	5.3	5.4	1.3	1.9	3.0

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Student group	Dual credit 2013/14	Dual credit 2014/15	Dual credit 2015/16	Community college dual credit 2013/14	Community college dual credit 2014/15	Community college dual credit 2015/16	CTE dual credit (subset of community college dual credit) 2013/14	CTE dual credit (subset of community college dual credit) 2014/15	CTE dual credit (subset of community college dual credit) 2015/16	University dual credit 2013/14	University dual credit 2014/15	University dual credit 2015/16
Never had an IEP (K–12)	17.2	19.3	20.9	15.5	17.2	18.5	6.5	6.8	7.0	2.4	3.1	3.8
Ever had an IEP (K–12)	7.6	8.9	9.7	6.9	8.1	8.8	3.7	3.7	4.0	0.8	1.1	1.3
High achiever on state reading and math assessments in high school	27.9	32.1	35.8	24.7	28.1	30.7	9.0	9.6	10.1	4.6	6.1	8.4
Attended high school in urban area	14.3	17.0	17.0	13.0	15.8	15.1	6.2	6.7	6.2	1.8	1.7	2.6
Attended high school in suburban area	15.8	17.3	18.6	14.5	15.4	16.1	5.9	5.8	5.9	1.9	2.8	3.8
Attended high school in rural area	17.3	18.9	18.2	15.1	16.1	16.6	6.6	6.8	6.7	3.0	4.2	2.9

Panel C. Percentage of student group that took direct enrollment

	Direct enrollment			Community college direct enrollment			University direct enrollment		
Student group	**2013/14**	**2014/15**	**2015/16**	**2013/14**	**2014/15**	**2015/16**	**2013/14**	**2014/15**	**2015/16**
Male	3.9	4.1	4.2	3.5	3.7	3.8	0.4	0.4	0.4
Female	5.1	5.2	5.4	4.6	4.7	5.0	0.6	0.5	0.6
White	4.9	5.1	5.1	4.5	4.7	4.7	0.5	0.4	0.5
Multiracial	4.8	4.4	5.0	4.2	4.1	4.5	0.7	0.4	0.6
Hispanic/Latino	3.4	3.5	3.8	3.1	3.3	3.5	0.3	0.3	0.3
Asian	4.7	4.6	6.0	3.6	3.5	4.5	1.2	1.2	1.6
Pacific Islander	2.9	3.4	3.1	2.8	3.3	3.0	0.1	0.2	0.1
Black	3.3	4.4	5.3	3.0	4.2	4.5	0.4	0.2	0.8
American Indian/Alaska Native	3.2	3.7	4.0	3.0	3.5	3.7	0.2	0.3	0.3
Never economically disadvantaged (K–12)	6.1	6.2	6.0	5.4	5.5	5.3	0.8	0.8	0.8
Ever economically disadvantaged (K–12)	3.7	3.9	4.3	3.4	3.6	3.9	0.3	0.3	0.4
Never English learner (K–12)	4.7	4.8	4.9	4.2	4.4	4.4	0.5	0.5	0.5
Ever English learner (K–12)	3.3	3.6	4.4	3.0	3.4	3.9	0.3	0.2	0.5
Never had an IEP (K–12)	5.0	5.1	5.3	4.5	4.7	4.8	0.6	0.5	0.6
Ever had an IEP (K–12)	2.6	3.0	3.2	2.4	2.7	2.9	0.2	0.3	0.2

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	Direct enrollment			Community college direct enrollment			University direct enrollment		
Student group	**2013/14**	**2014/15**	**2015/16**	**2013/14**	**2014/15**	**2015/16**	**2013/14**	**2014/15**	**2015/16**
High achiever on state reading and math assessments in high school	6.6	7.0	7.2	5.5	6.0	6.2	1.2	1.1	1.2
Attended high school in urban area	3.2	3.1	4.2	2.5	2.6	3.6	0.7	0.6	0.6
Attended high school in suburban area	4.1	4.5	5.3	3.9	4.3	5.0	0.3	0.3	0.3
Attended high school in rural area	5.7	5.7	5.9	5.1	5.2	5.5	0.6	0.6	0.5

Panel D. Percentage of student group that took AP/IB

	AP exam			AP course			IB course		
Student group	**2013/14**	**2014/15**	**2015/16**	**2013/14**	**2014/15**	**2015/16**	**2013/14**	**2014/15**	**2015/16**
Male	6.7	7.5	7.7	N/A	11.8	13.0	N/A	3.6	3.9
Female	9.3	10.1	10.7	N/A	15.9	17.4	N/A	4.6	4.8
White	8.7	9.4	9.9	N/A	14.9	16.2	N/A	4.1	4.2
Multiracial	9.7	10.6	10.8	N/A	16.3	17.2	N/A	5.3	6.1
Hispanic/Latino	4.6	5.6	5.9	N/A	9.4	11.1	N/A	3.7	3.8
Asian	21.3	22.5	23.2	N/A	28.4	30.1	N/A	9.0	9.7
Pacific Islander	4.9	5.2	6.3	N/A	10.7	13.5	N/A	2.2	3.2
Black	4.1	4.2	4.4	N/A	8.4	9.3	N/A	2.6	3.3
American Indian/Alaska Native	3.3	3.9	3.6	N/A	8.0	7.6	N/A	1.6	1.8
Never economically disadvantaged (K–12)	14.9	16.2	16.8	N/A	22.9	24.5	N/A	7.3	7.5
Ever economically disadvantaged (K–12)	4.7	5.4	5.7	N/A	9.7	10.9	N/A	2.7	2.9
Never English learner (K–12)	8.4	9.2	9.6	N/A	14.5	15.7	N/A	4.1	4.3
Ever English learner (K–12)	5.7	6.8	7.3	N/A	10.4	12.6	N/A	4.1	4.3
Never had an IEP (K–12)	9.5	10.4	10.9	N/A	16.3	17.8	N/A	4.7	5.0
Ever had an IEP (K–12)	3.0	3.4	3.5	N/A	5.7	6.4	N/A	2.1	2.2

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Student group	AP exam 2013/14	AP exam 2014/15	AP exam 2015/16	AP course 2013/14	AP course 2014/15	AP course 2015/16	IB course 2013/14	IB course 2014/15	IB course 2015/16
High achiever on state reading and math assessments in high school	21.6	24.2	26.0	N/A	32.5	35.9	N/A	9.1	9.6
Attended high school in urban area	10.0	11.0	10.8	N/A	15.9	17.6	N/A	8.6	8.6
Attended high school in suburban area	9.5	10.3	10.0	N/A	16.2	16.1	N/A	2.8	2.7
Attended high school in rural area	3.6	4.1	3.8	N/A	8.8	8.3	N/A	0.3	0.4

N/A indicates AP and IB course data were not available in 2013/14.

Note: Student population includes 187,381 students in 2013/14; 188,502 students in 2014/15; and 190,080 students in 2015/16.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

Table A4. School-level predictors of accelerated learning participation rates in 2015/16

	Percentage of students at school enrolling in:			
	Any accelerated learning	**Dual credit**	**AP courses**	**Direct enrollment**
	Standardized coefficients with robust standard errors in parentheses			
Number of students in high school (log)	0.007 (0.010)	-0.002 (0.009)	0.009 (0.009)	-0.029*** (0.007)
Suburban school	-0.057** (0.021)	-0.005 (0.022)	-0.027 (0.029)	-0.009 (0.017)
Rural school	-0.081** (0.025)	-0.006 (0.025)	-0.050 (0.026)	-0.039 (0.021)
Charter school	0.015 (0.028)	-0.026 (0.027)	-0.017 (0.032)	0.060* (0.029)
Percentage of students who were ever economically disadvantaged (K–12)	-0.192** (0.071)	0.060 (0.065)	-0.126* (0.063)	0.001 (0.042)
Percentage of students who ever received English learner services (K–12)	0.297** (0.112)	0.081 (0.122)	-0.095 (0.134)	0.214 (0.114)
Percentage of students expelled or suspended that year	0.107 (0.143)	0.267* (0.135)	-0.092 (0.124)	-0.140 (0.097)
Percentage of students scoring in the top quartile in the state math assessment in high school	0.215 (0.315)	0.103 (0.475)	0.546 (0.622)	0.380 (0.253)
Percentage of students scoring in the top quartile in the state reading assessment in high school	0.201 (0.346)	0.637 (0.427)	-0.246 (0.603)	-0.289 (0.297)
Annual attendance rate that year	0.631*** (0.121)	0.526*** (0.117)	0.127 (0.166)	0.151 (0.133)
Percentage of students of color in high school	-0.145 (0.097)	-0.103 (0.109)	0.069 (0.125)	-0.113 (0.093)
Percentage of students who had an IEP that year	-0.483*** (0.130)	-0.432* (0.170)	-0.187 (0.138)	-0.161 (0.106)

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	Percentage of students at school enrolling in:			
	Any accelerated learning	**Dual credit**	**AP courses**	**Direct enrollment**
	Standardized coefficients with robust standard errors in parentheses			
Constant	-0.070	-0.284*	0.106	0.155
	(0.145)	(0.129)	(0.195)	(0.152)
Observations	314	270	217	297
R-squared	0.351	0.168	0.154	0.165

Note: Results are from OLS linear regression models that explore the relationship between school characteristics and the percentage of students at a school participating in accelerated learning, dual credit, AP courses, and direct enrollment. Robust standard errors are in parenthesis.

Stars represent the following significance levels: *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

Table A5. Student-level predictors of accelerated learning participation in 2015/16

Variables	Any accelerated learning (across high schools in the state)	Any accelerated learning (within high schools in the state)	AP course/ exam	Dual credit	Direct enrollment	Regional Promise
	Marginal effects with robust standard errors in parentheses					
Female	0.047*** (0.002)	0.050*** (0.002)	0.020*** (0.001)	0.028*** (0.002)	0.008*** (0.001)	0.008 (0.004)
Multiracial	0.009 (0.006)	0.011 (0.006)	0.005 (0.003)	0.000 (0.004)	-0.000 (0.002)	0.006 (0.013)
Hispanic/Latino	-0.005 (0.004)	-0.009* (0.004)	-0.002 (0.002)	-0.012*** (0.003)	-0.008*** (0.001)	0.010 (0.007)
Asian	0.097*** (0.007)	0.103*** (0.007)	0.071*** (0.005)	0.032*** (0.005)	0.001 (0.002)	0.036 (0.020)
Pacific Islander	-0.030* (0.014)	-0.031* (0.013)	0.014 (0.010)	-0.027* (0.011)	-0.012* (0.005)	-0.016 (0.027)
Black	0.003 (0.008)	-0.006 (0.008)	-0.002 (0.005)	0.004 (0.007)	0.016*** (0.004)	0.001 (0.021)
American Indian/Alaska Native	-0.043*** (0.007)	-0.033*** (0.007)	-0.023*** (0.005)	-0.027*** (0.005)	-0.004 (0.003)	-0.010 (0.011)
Ever economically disadvantaged (K–12)	-0.111*** (0.003)	-0.117*** (0.003)	-0.055*** (0.002)	-0.041*** (0.002)	-0.006*** (0.001)	-0.031*** (0.006)
Had an IEP (K–12)	-0.093*** (0.003)	-0.093*** (0.003)	-0.046*** (0.002)	-0.050*** (0.002)	-0.007*** (0.001)	-0.046*** (0.005)

Continued on p. A-15

Variables	Any accelerated learning (across high schools in the state)	Any accelerated learning (within high schools in the state)	AP course/ exam	Dual credit	Direct enrollment	Regional Promise
	Marginal effects with robust standard errors in parentheses					
Former English learner (K–8)	0.068*** (0.004)	0.065*** (0.004)	0.026*** (0.003)	0.036*** (0.003)	0.015*** (0.002)	0.016 (0.009)
Current English learner, grades 9–12	-0.114*** (0.006)	-0.117*** (0.006)	-0.066*** (0.003)	-0.065*** (0.005)	-0.011*** (0.003)	-0.045*** (0.013)
Average attendance rate in middle school	0.024*** (0.007)	0.003 (0.007)	-0.015** (0.005)	0.053*** (0.005)	-0.024*** (0.003)	-0.010 (0.013)
Number of schools in middle school	-0.042*** (0.002)	-0.038*** (0.002)	-0.021*** (0.001)	-0.025*** (0.001)	-0.004*** (0.001)	-0.006 (0.003)
Number of suspensions/ expulsions in middle school	-0.030*** (0.001)	-0.026*** (0.001)	-0.020*** (0.001)	-0.024*** (0.001)	-0.001* (0.000)	-0.004*** (0.001)
Math and reading test scores meets or exceeds in grade 8	0.266*** (0.003)	0.271*** (0.003)	0.166*** (0.002)	0.146*** (0.002)	0.028*** (0.001)	0.085*** (0.005)
Attended suburban high school	-0.051*** (0.003)	-0.051*** (0.003)	-0.013*** (0.001)	0.016*** (0.002)	0.014*** (0.001)	0.044 (0.027)
Attended rural high school	-0.088*** (0.003)	-0.088*** (0.003)	-0.065*** (0.002)	0.032*** (0.003)	0.024*** (0.002)	0.053* (0.021)
Observations	181,837	181,837	181,837	181,837	181,837	42,752

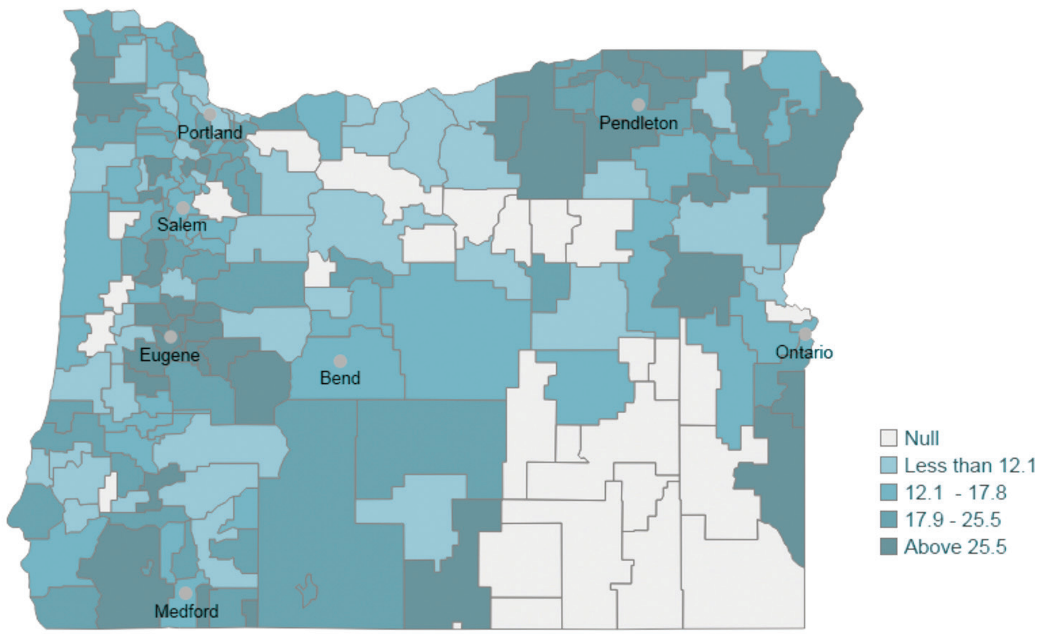
Note: All models are logistic regression models. The table displays marginal effects. The marginal effect is the difference in the predicted probability of achieving the outcome associated with a given predictor. Robust standard errors are in parentheses.

Stars represent the following significance levels: *** p<0.001, ** p<0.01, * p<0.05.

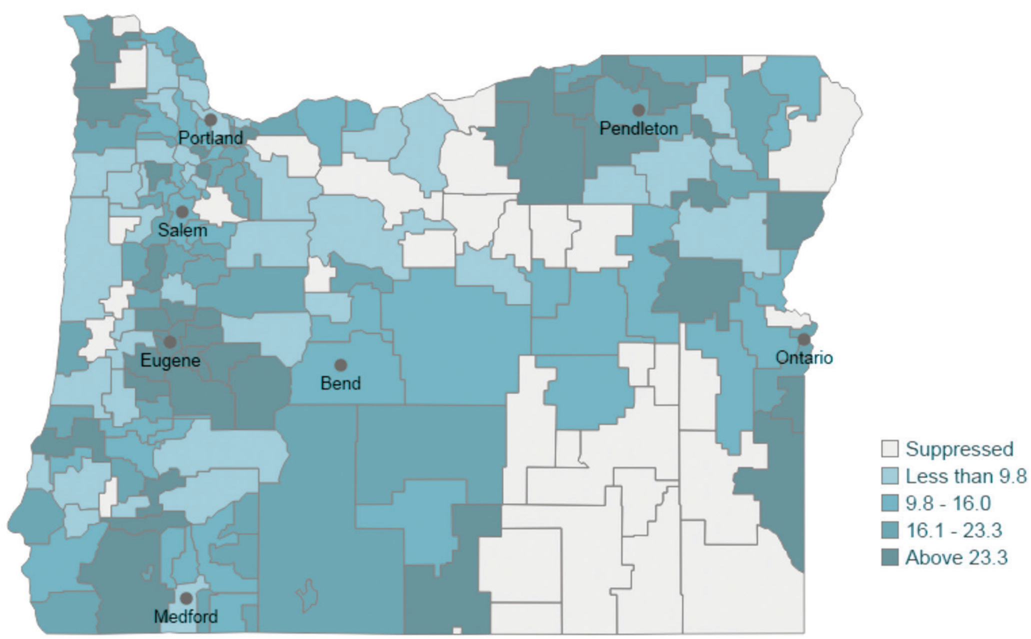
Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

Figure A1. Dual-credit participation rates by school district (2015/16)

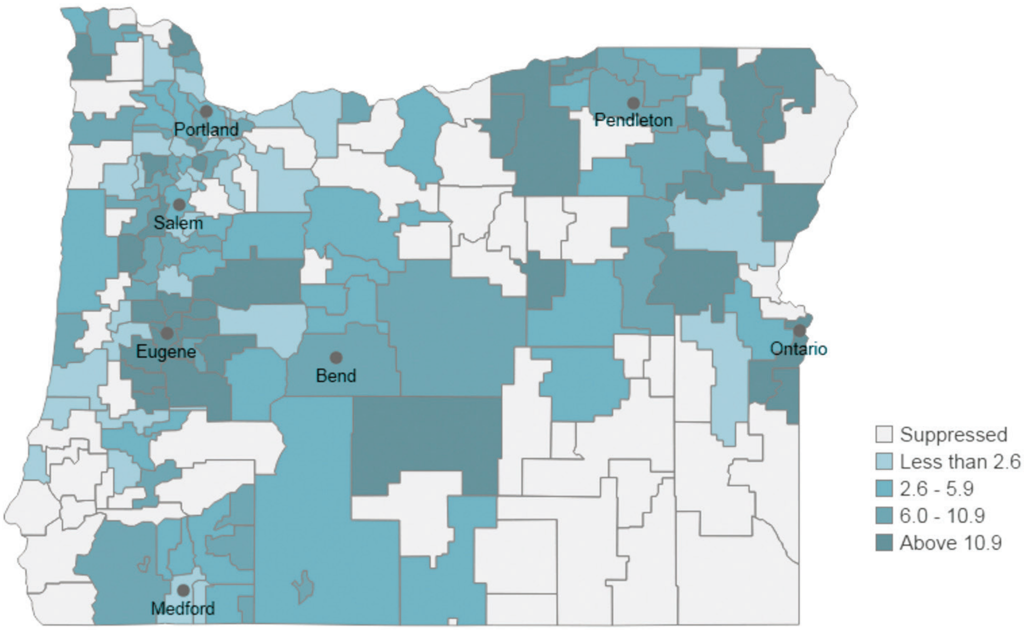
Panel A. Dual credit (community college and university)



Panel B. Community college dual credit



Panel C. CTE dual credit



Panel D. University dual credit

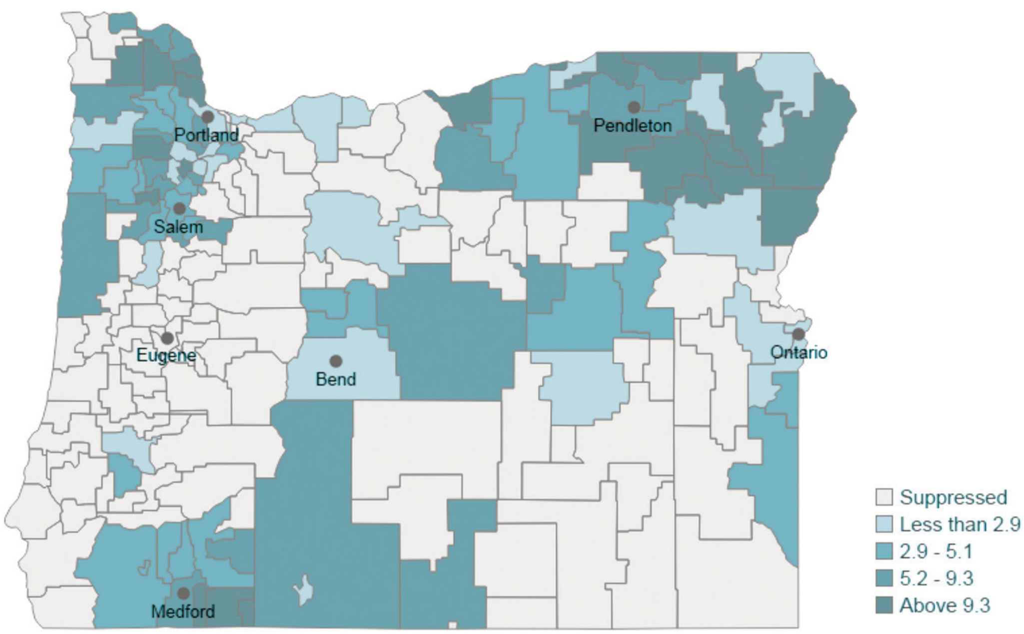
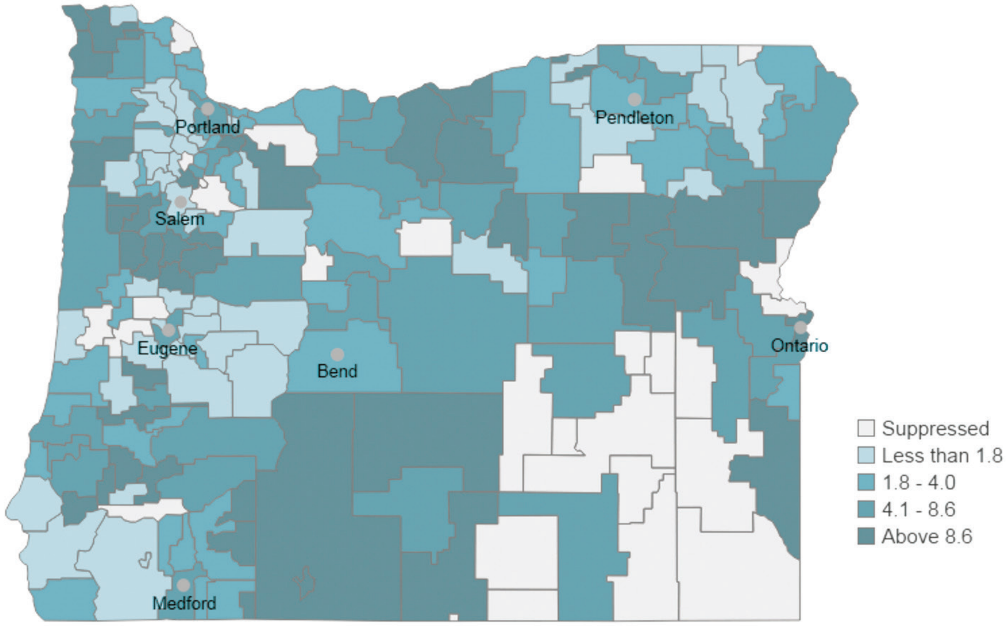


Figure A2. Direct enrollment participation rates by school district (2015/16)

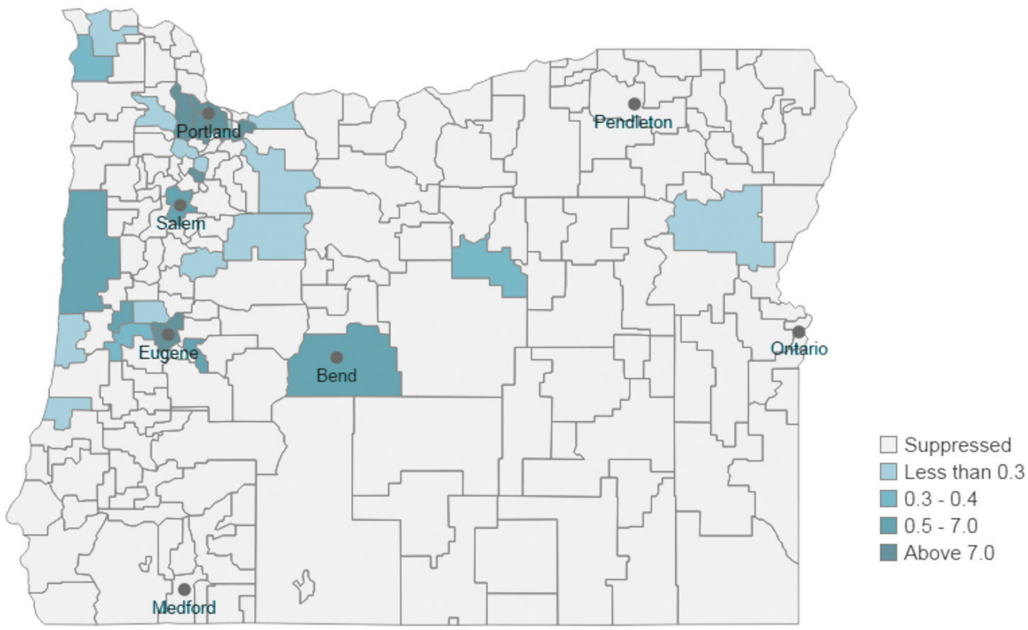


Note: Each shape is a school district. School district dual-credit and direct enrollment participation rates for 2015/16 were divided into quartiles, and each color represents a quartile. Districts colored in darker shades had higher participation rates. Suppressed means fewer than 10 students participated.

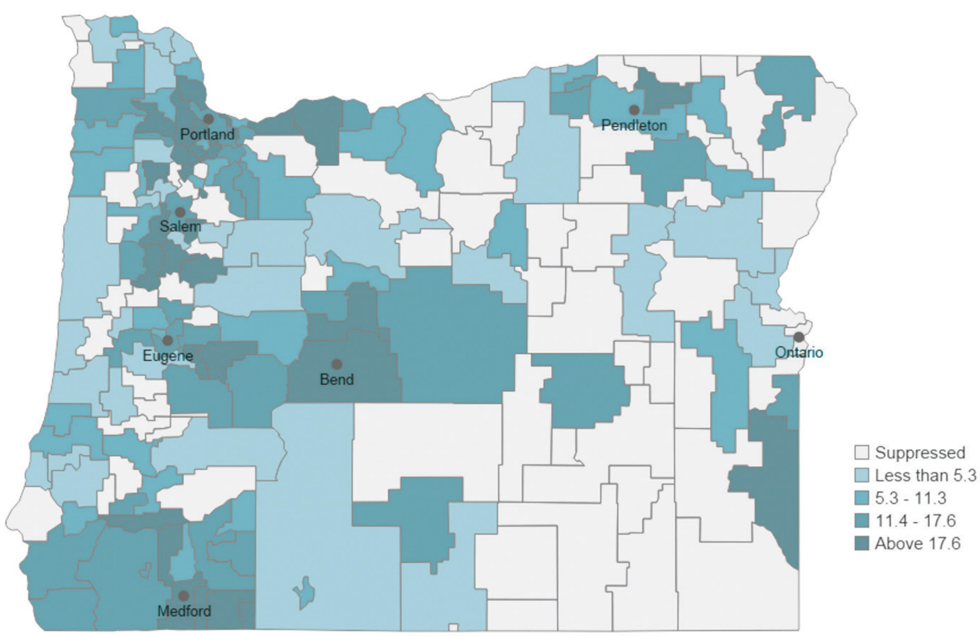
Source: Authors' analysis of data from the Oregon Department of Education and Higher Education Coordinating Commission.

Figure A3. International Baccalaureate (IB) and Advanced Placement (AP) coursetaking participation rates by school district (2015/16)

Panel A. IB coursetaking



Panel B. AP coursetaking



Note: Each shape is a school district. IB and AP coursetaking rates for 2015/16 were divided into quartiles, and each color represents a quartile. Districts colored in darker shades had higher participation rates. Suppressed means fewer than 10 students participated.

Source: Authors' analysis of data from the Oregon Department of Education.

Appendix B: High School-to-College Outcomes

METHODS

This study examines the relationship between accelerated learning and high school graduation, college enrollment, and college persistence outcomes for a single cohort: students who were first-time freshmen in 2011/12 and thus expected to graduate from public high school in 2014/15. The study team had access to National Student Clearinghouse postsecondary data through fall 2016, representing 1.5 years after high school exit for this cohort. Table B1 outlines the accelerated learning data availability during these students' high school years.

Table B1. Accelerated learning data availability for class of 2014/15 (freshmen in 2011/12)

	High school years			
	2011/12	2012/13	2013/14	2014/15
Dual credit	●	●	●	●
Direct enrollment	●	●	●	●
AP exam			●	●
AP course				●
Regional Promise				●
IB course				●

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

The authors conducted the analysis with five separate samples of students: 1) students who took any accelerated learning (dual credit, direct enrollment, AP course/exam, and/or IB course) or no accelerated learning; 2) students who took dual credit only or no accelerated learning; 3) students who took CTE dual credit only or no accelerated learning; 4) students who took direct enrollment only or no accelerated learning; and 5) students who took AP exam/course or no accelerated learning. Each analysis sample included students who took a specific type of accelerated learning, as well as students who took no accelerated learning, to better isolate the unique contribution of that accelerated learning type on outcomes. Even though AP coursetaking data are only available in students' senior year and AP test-taking in junior and senior year, the authors included this type because it is the second most popular form of accelerated learning, and most AP test takers are juniors or seniors (see table B1). This analysis excludes Regional Promise because the program started when students in this sample were in their senior year. Regional Promise courses have a focus on increasing college-going starting in grade 9, including offering dual credit to grade 9 students.

This analysis also excludes IB because data were only available for students' senior years.

The authors used propensity score matching to identify students in each sample with a similar propensity, or likelihood, to participate in the accelerated learning type based on background characteristics and academic achievement and engagement from middle school (since predictors of the treatment must have occurred before the treatment and accelerated learning may begin in grade 9). The variables included gender, race/ethnicity, ever eligible for free or reduced-price lunch K–12, former English learner K–8, current English learner grades 9–12, ever had an IEP K–12, number of days expelled or suspended (in-school or out-of-school suspension) in middle school, average attendance rate in middle school, number of middle schools attended, and met or exceeded standards on state math and reading assessments in grade 8.

The matching model imposed a caliper of 0.10 such that controls were discarded if their propensity scores were not within 0.10 standard deviations of the treated. After matching, student-level characteristics were statistically similar across participants and the comparison group of students who took no accelerated learning. Table B2 illustrates the means for every variable after the matching procedure, demonstrating successful balancing of the covariates in the two groups.

After identifying a matched comparison group for each accelerated learning type, the authors estimated the relationship between the accelerated learning type and outcomes using a logistic regression model that weighted students with a similar propensity to participate in accelerated learning more heavily and controlled for middle school background characteristics and the high school that the student attended. The full logistic model is below.

(1) $$PR(Outcome)_{is} = \alpha + \beta AcceleratedLearning_{is} + \beta Gender_{is} + \beta Race_{is} + \beta FRPL_{is} + \beta IEP_{is} + \beta EL_{is} + \beta Attendance_{is} + \beta Mobility_{is} + \beta Discipline_{is} + \beta Achievement_{is} + \beta HS_{is} + \varepsilon_{is}$$

The dependent variables included indicators of graduated from high school, enrolled in college as of fall 2016 (based on NSC data), and persisted or completed college as of fall 2016 (based on NSC data). Independent variables included the same variables used in the matching model described above. The model also includes high school fixed effects, which account for school quality and other institutional factors that are correlated with the outcomes of interest. The authors also ran these models for three groups of historically underrepresented students: American Indian/Alaska Native students, Black students, and Hispanic/Latino students.

Logistic regression models produce odds ratio coefficients. To ease the interpretation of the coefficient estimates, the study team translated the odds ratios into marginal effects. The marginal effects from these regressions are displayed in tables B3 and B4.

FINDINGS

Table B2. Difference in means post-match between students who took accelerated learning and students who did not take any accelerated learning in the class of 2014/15

	No accelerated learning N = 21,503	Any accelerated learning N = 22,105	No accelerated learning N = 21,401	Took AP course/ exam only N = 3,327	No accelerated learning N = 21,499	Took dual credit only N = 7,241	No accelerated learning N = 21,502	Took CTE dual credit only N = 2,616	No accelerated learning N = 21,507	Took direct enrollment only N = 2,138
Female	54%	54%	50%	52%	51%	51%	50%	51%	50%	53%
Multiracial	3%	3%	4%	4%	3%	3%	4%	4%	2%	2%
Hispanic/Latino	18%	17%	19%	19%	20%	20%	23%	23%	21%	21%
Asian	5%	5%	7%	7%	3%	3%	2%	2%	3%	3%
Pacific Islander	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
Black	2%	2%	2%	2%	2%	2%	3%	3%	2%	2%
American Indian/ Alaska Native	2%	2%	1%	1%	2%	2%	3%	3%	3%	3%
Ever economically disadvantaged (K–12)	57%	57%	51%	52%	66%	66%	70%	70%	65%	65%
Had an IEP (K–12)	14%	14%	12%	12%	18%	17%	21%	21%	19%	19%
Former English learner (K–8)	12%	11%	14%	14%	12%	12%	13%	13%	13%	13%

Continued on p. B-4

	No accelerated learning N = 21,503	Any accelerated learning N = 22,105	No accelerated learning N = 21,401	Took AP course/ exam only N = 3,327	No accelerated learning N = 21,499	Took dual credit only N = 7,241	No accelerated learning N = 21,502	Took CTE dual credit only N = 2,616	No accelerated learning N = 21,507	Took direct enrollment only N = 2,138
Current English learner, grades 9–12	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Average attendance rate in middle school	90%	90%	90%	90%	91%	91%	88%	88%	92%	92%
Number of schools in middle school	2.85	2.83	2.84	2.82	2.89	2.89	2.93	2.95	2.93	2.92
Number of suspensions or expulsions in middle school	0.32	0.38	0.26	0.24	0.44	0.47	0.77	0.78	0.44	0.40
Math test score meets or exceeds in grade 8	76%	76%	79%	79%	68%	68%	57%	57%	67%	67%
Reading test score meets or exceeds in grade 8	80%	81%	83%	83%	74%	74%	67%	67%	73%	73%

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.

Table B3. Relationship between accelerated learning and outcomes for the class of 2014/15

Panel A. Relationship between accelerated learning and outcomes and AP course/exam and outcomes

	Took any accelerated learning			Took AP course/exam vs nothing		
	Graduated from high school	**Enrolled in college**	**Persisted as of fall 2016**	**Graduated from high school**	**Enrolled in college**	**Persisted as of fall 2016**
	Marginal effects with robust standard errors in parentheses					
Took accelerated learning model	0.296*** (0.005)	0.245*** (0.005)	0.217*** (0.005)	0.398*** (0.022)	0.351*** (0.013)	0.289*** (0.012)
Female	0.001 (0.006)	0.051*** (0.007)	0.059*** (0.006)	0.026 (0.016)	0.041 (0.022)	0.083*** (0.022)
Multiracial	-0.014 (0.018)	0.029 (0.019)	0.039* (0.018)	0.021 (0.023)	0.089 (0.047)	0.081 (0.057)
Hispanic/Latino	-0.002 (0.009)	0.004 (0.011)	-0.002 (0.010)	0.025 (0.020)	-0.057 (0.034)	-0.061 (0.033)
Asian	0.005 (0.018)	0.111*** (0.021)	0.123*** (0.020)	0.038 (0.022)	0.173*** (0.043)	0.266*** (0.050)
Pacific Islander	0.011 (0.036)	0.034 (0.054)	-0.044 (0.044)	0.041* (0.019)	-0.090 (0.142)	-0.107 (0.128)
Black	-0.001 (0.022)	0.106*** (0.025)	0.074** (0.025)	0.055** (0.019)	0.185*** (0.053)	0.244*** (0.066)
American Indian/Alaska Native	-0.083*** (0.022)	-0.058** (0.022)	-0.050* (0.020)	-0.100 (0.074)	-0.015 (0.074)	-0.051 (0.073)
Ever economically disadvantaged (K–12)	-0.116*** (0.005)	-0.222*** (0.007)	-0.212*** (0.007)	-0.060*** (0.010)	-0.213*** (0.021)	-0.246*** (0.023)

Continued on p. B-6

	Took any accelerated learning			Took AP course/exam vs nothing		
	Graduated from high school	**Enrolled in college**	**Persisted as of fall 2016**	**Graduated from high school**	**Enrolled in college**	**Persisted as of fall 2016**
	Marginal effects with robust standard errors in parentheses					
Ever had an IEP (K–12)	0.009 (0.008)	-0.029** (0.010)	-0.022* (0.009)	-0.052* (0.026)	-0.043 (0.031)	-0.056 (0.030)
Former English learner (K–8)	0.063*** (0.009)	0.103*** (0.013)	0.105*** (0.013)	-0.008 (0.036)	0.169*** (0.031)	0.105** (0.041)
Current English learner, grades 9–12	0.049** (0.016)	0.056* (0.025)	0.061* (0.026)	-0.006 (0.051)	-0.066 (0.076)	0.013 (0.077)
Average attendance rate in middle school	0.222*** (0.019)	0.046 (0.024)	0.034 (0.022)	0.181*** (0.044)	0.079 (0.072)	0.030 (0.071)
Number of schools in middle school	-0.033*** (0.006)	-0.026*** (0.006)	-0.033*** (0.006)	-0.053*** (0.011)	-0.071*** (0.018)	-0.047** (0.018)
Number of suspensions and expulsions in middle school	-0.016*** (0.002)	-0.025*** (0.004)	-0.029*** (0.005)	-0.005 (0.006)	-0.017 (0.010)	-0.035* (0.014)
Math test score meets or exceeds in grade 8	0.081*** (0.007)	0.130*** (0.008)	0.115*** (0.007)	0.077*** (0.018)	0.153*** (0.028)	0.154*** (0.028)
Reading test score meets or exceeds in grade 8	0.052*** (0.008)	0.087*** (0.009)	0.074*** (0.008)	-0.002 (0.021)	0.022 (0.032)	0.026 (0.033)
High school fixed effects	Included in model	Included in model	Included in model	Included in model	Included in model	Included in model
Observations	43,608	43,608	43,608	24,728	24,728	24,728

Panel B. Relationship between dual credit and outcomes

	Took dual credit vs nothing			Took CTE dual credit vs nothing		
	Graduated from high school	**Enrolled in college**	**Persisted as of fall 2016**	**Graduated from high school**	**Enrolled in college**	**Persisted as of fall 2016**
	Marginal effects with robust standard errors in parentheses					
Took accelerated learning model	0.300*** (0.006)	0.159*** (0.007)	0.121*** (0.006)	0.320*** (0.006)	0.160*** (0.011)	0.127*** (0.010)
Female	0.012 (0.009)	0.067*** (0.011)	0.065*** (0.010)	0.018* (0.009)	0.106*** (0.020)	0.094*** (0.018)
Multiracial	-0.033 (0.031)	0.041 (0.032)	0.042 (0.029)	0.018 (0.023)	0.005 (0.067)	-0.008 (0.059)
Hispanic/Latino	0.008 (0.014)	0.001 (0.018)	-0.002 (0.016)	0.011 (0.013)	0.041 (0.031)	0.016 (0.030)
Asian	0.023 (0.026)	0.097** (0.036)	0.111*** (0.033)	0.030 (0.018)	0.146* (0.061)	0.148* (0.062)
Pacific Islander	-0.015 (0.080)	-0.033 (0.094)	-0.147** (0.055)	-0.064 (0.114)	-0.250 (0.153)	-0.271*** (0.014)
Black	0.055* (0.022)	0.140*** (0.037)	0.065 (0.036)	0.039** (0.013)	0.193** (0.062)	0.098 (0.069)
American Indian/Alaska Native	-0.030 (0.030)	-0.013 (0.034)	-0.049 (0.028)	-0.017 (0.028)	0.105 (0.057)	0.015 (0.054)
Ever economically disadvantaged (K–12)	-0.106*** (0.007)	-0.212*** (0.012)	-0.193*** (0.012)	-0.049*** (0.008)	-0.132*** (0.022)	-0.153*** (0.021)

Continued on p. B-8

	Took dual credit vs nothing			Took CTE dual credit vs nothing		
	Graduated from high school	**Enrolled in college**	**Persisted as of fall 2016**	**Graduated from high school**	**Enrolled in college**	**Persisted as of fall 2016**
	Marginal effects with robust standard errors in parentheses					
Ever had an IEP (K–12)	0.042*** (0.011)	-0.022 (0.015)	-0.013 (0.013)	0.013 (0.010)	-0.025 (0.025)	-0.007 (0.023)
Former English learner (K–8)	0.059*** (0.013)	0.110*** (0.022)	0.107*** (0.022)	0.018 (0.014)	0.072 (0.037)	0.106** (0.038)
Current English learner, grades 9–12	0.043* (0.021)	0.103** (0.038)	0.096* (0.040)	0.007 (0.024)	0.023 (0.064)	0.068 (0.066)
Average attendance rate in middle school	0.156*** (0.033)	0.063 (0.041)	0.077* (0.037)	0.087** (0.028)	0.066 (0.072)	0.106 (0.067)
Number of schools in middle school	-0.024** (0.009)	-0.021* (0.010)	-0.033*** (0.009)	-0.020** (0.007)	-0.036* (0.017)	-0.045** (0.016)
Number of suspensions and expulsions in middle school	-0.010*** (0.002)	-0.025*** (0.005)	-0.029*** (0.007)	-0.009*** (0.002)	-0.010 (0.008)	-0.022* (0.011)
Math test score meets or exceeds in grade 8	0.051*** (0.010)	0.101*** (0.013)	0.084*** (0.011)	0.015 (0.011)	0.085*** (0.023)	0.069*** (0.021)
Reading test score meets or exceeds in grade 8	0.062*** (0.012)	0.089*** (0.015)	0.075*** (0.013)	0.044*** (0.013)	0.093*** (0.026)	0.080*** (0.023)
High school fixed effects	Included in model	Included in model	Included in model	Included in model	Included in model	Included in model
Observations	28,740	28,740	28,740	24,118	24,118	24,118

Panel C. Relationship between direct enrollment and outcomes

	Took direct enrollment versus nothing		
	Graduated from high school	**Enrolled in college**	**Persisted as of fall 2016**
	Marginal effects with robust standard errors in parentheses		
Took accelerated learning model	0.203*** (0.010)	0.178*** (0.012)	0.132*** (0.011)
Female	0.005 (0.017)	0.051* (0.021)	0.036 (0.019)
Multiracial	-0.118* (0.054)	0.011 (0.056)	-0.010 (0.050)
Hispanic/Latino	-0.028 (0.028)	-0.019 (0.033)	-0.014 (0.029)
Asian	-0.193* (0.079)	0.054 (0.075)	0.109 (0.069)
Pacific Islander	0.027 (0.117)	0.343*** (0.103)	0.359* (0.141)
Black	-0.148* (0.061)	-0.030 (0.067)	0.023 (0.066)
American Indian/Alaska Native	-0.022 (0.047)	-0.032 (0.066)	0.001 (0.060)
Ever economically disadvantaged (K–12)	-0.087*** (0.018)	-0.134*** (0.024)	-0.146*** (0.023)
Ever had an IEP (K–12)	0.015 (0.021)	-0.014 (0.027)	0.003 (0.025)
Former English learner (K–8)	0.113*** (0.023)	0.138*** (0.039)	0.182*** (0.040)
Current English learner, grades 9–12	0.087* (0.034)	0.074 (0.067)	0.081 (0.071)
Average attendance rate in middle school	0.287*** (0.046)	0.031 (0.061)	0.038 (0.056)
Number of schools in middle school	-0.067*** (0.011)	-0.034* (0.015)	-0.050*** (0.014)

Continued on p. B-10

	Took direct enrollment or nothing		
	Graduated from high school	**Enrolled in college**	**Persisted as of fall 2016**
	Marginal effects with robust standard errors in parentheses		
Number of suspensions and expulsions in middle school	-0.018*** (0.005)	-0.020* (0.009)	-0.024* (0.012)
Math test score meets or exceeds in grade 8	0.055** (0.021)	0.149*** (0.025)	0.141*** (0.023)
Reading test score meets or exceeds in grade 8	0.035 (0.022)	0.023 (0.028)	0.003 (0.026)
High school fixed effects	Included in model	Included in model	Included in model
Observations	23,645	23,645	23,645

Note: The method used here is propensity score weighting with covariate adjustment. All models are logistic regression models and include high school fixed effects. The table displays marginal effects. The marginal effect is the difference in the predicted probability of achieving the outcome associated with a given predictor. Marginal effects are not included on high school indicators because there are 326 high schools. The college enrollment and persistence outcomes are based on National Student Clearinghouse data and thus represent enrollment and persistence at colleges across the country. Robust standard errors are in parentheses.

Stars represent the following significance levels: *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, College Board, and the National Student Clearinghouse.

Table B4. Relationship between accelerated learning and outcomes for American Indian/Alaska Native, Black, and Hispanic/Latino students in the class of 2014/15

	American Indian/Alaska Native			Black			Hispanic/Latino		
	Graduated from high school	**Enrolled in college**	**Persisted as of fall 2016**	**Graduated from high school**	**Enrolled in college**	**Persisted as of fall 2016**	**Graduated from high school**	**Enrolled in college**	**Persisted as of fall 2016**
	Marginal effects with robust standard errors in parentheses								
Took any accelerated learning model	0.466*** (0.033)	0.254*** (0.033)	0.196*** (0.029)	0.360*** (0.031)	0.317*** (0.037)	0.236*** (0.033)	0.334*** (0.010)	0.261*** (0.012)	0.209*** (0.010)
Female	0.013 (0.049)	0.083 (0.049)	0.084 (0.043)	-0.023 (0.045)	0.128* (0.056)	0.062 (0.043)	0.001 (0.014)	0.030 (0.017)	0.046*** (0.014)
Ever economically disadvantaged (K–12)	-0.106* (0.045)	-0.153** (0.056)	-0.133** (0.049)	-0.077 (0.052)	-0.118 (0.079)	-0.187* (0.077)	-0.056** (0.020)	-0.153*** (0.030)	-0.160*** (0.030)
Ever had an IEP (K–12)	-0.020 (0.067)	0.002 (0.067)	0.020 (0.057)	-0.041 (0.054)	-0.040 (0.069)	0.013 (0.062)	0.003 (0.019)	-0.045 (0.023)	-0.041* (0.019)
Former English learner (K–8)	-0.070 (0.138)	-0.089 (0.091)	-0.077 (0.071)	0.103 (0.063)	0.111 (0.101)	0.211* (0.091)	0.080*** (0.015)	0.070*** (0.018)	0.077*** (0.015)
Current English learner, grades 9–12	0.202*** (0.050)	0.076 (0.233)	0.181 (0.258)	0.167*** (0.035)	0.178 (0.112)	0.213 (0.115)	0.041 (0.024)	-0.016 (0.034)	0.007 (0.029)
Average attendance rate in middle school	0.261 (0.134)	-0.135 (0.132)	-0.022 (0.105)	0.155 (0.119)	-0.078 (0.145)	0.093 (0.107)	0.286*** (0.046)	0.124* (0.061)	0.109* (0.053)
Number of schools in middle school	-0.101** (0.038)	-0.048 (0.034)	-0.059* (0.025)	-0.016 (0.034)	0.024 (0.038)	-0.010 (0.025)	-0.058*** (0.011)	-0.037** (0.014)	-0.037** (0.012)

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	American Indian/Alaska Native			Black			Hispanic/Latino		
	Graduated from high school	**Enrolled in college**	**Persisted as of fall 2016**	**Graduated from high school**	**Enrolled in college**	**Persisted as of fall 2016**	**Graduated from high school**	**Enrolled in college**	**Persisted as of fall 2016**
Number of suspensions and expulsions in middle school	-0.031* (0.013)	-0.016 (0.018)	-0.001 (0.014)	-0.011 (0.008)	-0.010 (0.011)	-0.030 (0.016)	-0.016*** (0.004)	-0.017* (0.007)	-0.021** (0.007)
Math test score meets or exceeds in grade 8	0.088 (0.051)	0.068 (0.056)	0.062 (0.048)	0.062 (0.047)	0.059 (0.056)	0.079 (0.050)	0.055*** (0.013)	0.109*** (0.016)	0.082*** (0.013)
Reading test score meets or exceeds in grade 8	0.130* (0.056)	0.140* (0.055)	0.074 (0.045)	0.059 (0.058)	0.148* (0.066)	0.102 (0.053)	0.069*** (0.015)	0.072*** (0.018)	0.067*** (0.015)
High school fixed effects	Included in model	Included in model	Included in model	Included in model	Included in model	Included in model	Included in model	Included in model	Included in model
Observations	1,285	1,285	1,285	1,074	1,074	1,074	9,605	9,605	9,605

Note: The method used here is propensity score weighting with covariate adjustment. All models are logistic regression models and include high school fixed effects. The table displays marginal effects. The marginal effect is the difference in the predicted probability of achieving the outcome associated with a given predictor. Marginal effects are not included on high school indicators because there are 326 high schools. The college enrollment and persistence outcomes are based on National Student Clearinghouse data and thus represent enrollment and persistence at colleges across the country. Robust standard errors are in parentheses.

Stars represent the following significance levels: *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, College Board, and the National Student Clearinghouse.

Appendix C: Accelerated Learning Credit Transfer

METHODS

The study authors conducted three different analyses to understand the issue of accelerated learning transfer. The first analysis examines college credits accepted at Oregon public universities because only the public universities record the number of transfer credits accepted. The sample includes students in the class of 2014/15 (i.e., high school freshmen in 2011/12) who earned college credits from dual credit, direct enrollment, and/or AP in high school and entered an Oregon public university in 2015/16.

To conduct this analysis, the authors computed the total college credits earned in high school and total transfer credits accepted. To compute the former, the authors summed the total number of potential college credits earned in high school from dual credit, direct enrollment, and AP exams.

Students who attend the same Oregon public postsecondary institution that they earned college credits from in high school are automatically awarded those credits. For these students, the transferred credits accepted variable does not include credits earned from college courses taken in high school from the same institution they attended after high school. Therefore, to compute the total transferred credits accepted, the authors summed the total transferred credits accepted value from the universities and the credits earned in high school if they were from the same institution the student attended after high school.

To compute the credit transfer rate, the authors divided the total number of transferred credits accepted by the total number of college credits earned in high school. This rate provides suggestive evidence regarding how many credits were accepted, but there are several limitations of this analysis. See the examples below to understand the study approach and the limitations.

Table C1. Student 1 credit transfer example

Credit type	Number of credits	Data source
Total college credits earned in high school	**12**	**Sum of all college credits earned in high school**
Dual credit	9	A sum of all community college and university dual credits earned in high school
Direct enrollment	0	A sum of all community college and university credit-bearing non-dual credits earned in high school
AP	3	College Board data on AP exam-taking; we gave students three credits for each exam passed (a score of 3 or higher)
Total transferred credits accepted	**9**	**Sum of credits earned in high school from same institution attended after high school plus transferred credits accepted**
Credits earned in high school from same institution attended after high school	3	A sum of all college credits earned in high school from the same institution attended after high school
Transferred credits accepted	6	A variable collected by the state from universities
Credit transfer rate	**9/12 = 75%**	**Divide transferred credits accepted by college credits earned in high school**

Interpretation: This student potentially transferred 75 percent of the college credits they earned in high school. It is not clear if one of the dual-credit classes did not transfer, the credits from the AP exam did not transfer, or if another course we do not see in the data (for example, an AP exam they took as a freshman or sophomore) did not transfer. College credits from an AP exam may not transfer because the student did not report the score, or college credits are only conferred for scores of 4 or 5.

Table C2. Student 2 credit transfer example

Credit type	Number of credits	Data source
Total college credits earned in high school	**12**	**Sum of all college credits earned in high school**
Dual credit	6	A sum of all community college and university dual credits earned in high school
Direct enrollment	3	A sum of all community college and university non-dual credits earned in high school
AP	3	College Board data on AP exam taking; we gave students 3 credits for each exam passed (score of 3 or higher)
Total transferred credits accepted	**15**	**Sum of credits earned in high school from same institution attended after high school plus transferred credits accepted**
Credits earned in high school from same institution attended after high school	0	A sum of all college credits earned in high school from the same institution attended after high school
Transferred credits accepted	15	A variable collected by the state from universities
Credit transfer rate	**15/12 = 125%**	**Divide transferred credits accepted by college credits earned in high school**

Interpretation: This student potentially transferred 125 percent of the college credits they earned in high school. They transferred credits from a course we do not see in the data (for example, an IB exam). This provides suggestive evidence that all their dual credits, direct-enrollment credits, and AP credits transferred.

The study reports the percentage of students who fall into each of the following categories (table C3).

Table C3. Student categories: Types of credit transfer for the class of 2014/15 who attended an Oregon public university

Category	Sample size	Average number of credits earned in high school
Transferred no college credits earned in high school (0 percent)	443	11
Transferred more than 0 but less than half of credits (> 0 and < 50 percent)	178	24
Transferred at least half but not all credits (> = 50 percent and < 100 percent)	691	32
Transferred all credits earned in high school (100 percent or more)	2,718	21

Source: Authors' analysis of data from the Oregon Department of Education and Higher Education Coordinating Commission.

The second analysis explores the transfer of dual-credit college math and English composition among students in the class of 2014/15 who earned college credit in dual-credit math or English in high school and then entered an Oregon public university or community college in 2015/16. The analysis excludes students who earned credit from dual-credit remedial math and English (in other words, course numbers below 100); 199 students earned credit in dual-credit math courses with a course number below 100, and 11 students earned credit in dual-credit English courses with a course number below 100. Although adding these students to the analysis does not change the results, the analysis is intended to understand the transfer of dual-credit non-remedial college courses.

The authors identified the first math and English courses of the students in the sample in their first year in college and compared the course number of the dual-credit math and college math courses and the dual-credit English and college English courses. They calculated the percentage of students who 1) took a college math/English course with a course number that was lower than their dual-credit math/English course, 2) took a college math/English course with a course number that was the same as their dual-credit math/English course, 3) took a college math/English course with a course number that was higher than their dual-credit math/English course, 4) did not take a college math/English course in their first year in college and had enrollment records in fall 2016 (based on NSC data) (perhaps because they completed their prerequisite course requirements in these subjects), and 5) did not take a college math/English course in their first year of college and did not have enrollment records in fall 2016 (based on NSC data), meaning they stopped or dropped out. These percentages are displayed in figure 9.

Last, the study team ran OLS linear regression models to understand the relationship between student-level characteristics and the credit transfer rate and logistic regression models to understand the relationship between student-level characteristics and the likelihood of taking the same or a lower-level course (versus a higher-level course). The models are below. Regression results are in table C4.

(1) $(Credittransferrate)_i = \alpha + \beta Gender_i + \beta Race_i + \beta FRPL_i + \beta IEP_i + \beta EL_i + \beta Achievement_i + \beta Schoollocation_i + \beta College_i + \varepsilon_i$

In the OLS linear regression examining predictors of the credit transfer rate, the student-level characteristics included binary indicators of gender, race/ethnicity, eligibility for free or reduced-price lunch ever, having an IEP ever, receiving English learner services ever, scoring in the top quartile on the reading and math state assessments in high school, and high school location (rural, urban, and suburban). The models also include indicators of the college students attended after high school.

(2) $Pr(Tooksameorlowercoursenumber)_i = \alpha + \beta Gender_i + \beta Race_i + \beta FRPL_i + \beta IEP_i + \beta EL_i + \beta Achievement_i + \beta Schoollocation_i + \beta Courselocation_i + \beta Coursenumber_i + \beta College_i + \varepsilon_i$

In the logistic regressions examining predictors of taking the same or lower math/English course in college compared to the dual-credit college math/English course, the student-level characteristics included indicators of gender, race/ethnicity, eligibility for free or reduced-price lunch ever, having an IEP ever, receiving English learner services ever, scoring in the top quartile on the reading and math state assessments in high school, and high school location (rural, urban, and suburban). The models also included indicators that the dual-credit course was offered by the university (compared with community college), the course number of the dual-credit course, and the college students attended after high school.

Logistic regression models produce odds ratio coefficients. To ease the interpretation of the coefficient estimates, the study team translated the odds ratios into marginal effects. The marginal effect is the difference in the predicted probability of achieving the outcome associated with a given predictor. This study reports the marginal effect estimates, not the odds ratios.

FINDINGS

Table C4. Predictors of accelerated learning credit transfer for the class of 2014/15

	Predictors of credit transfer rate	**Predictors of taking same or lower course number in math**	**Predictors of taking same or lower course number in English**
	Standardized coefficients with robust standard errors in parentheses	Marginal effects with robust standard errors in parentheses	
Female	0.005 (0.058)	0.040 (0.029)	-0.002 (0.030)
Multiracial	-0.089 (0.151)	-0.014 (0.072)	0.131 (0.100)
Hispanic/Latino	0.101 (0.100)	0.098* (0.049)	0.044 (0.050)
Asian	0.049 (0.110)	-0.018 (0.061)	0.027 (0.074)
Pacific Islander	-0.466 (0.631)	no observations	no observations
Black	-0.270 (0.292)	0.342* (0.174)	0.122 (0.163)
American Indian/Alaska Native	-0.046 (0.241)	0.152 (0.105)	0.019 (0.092)
Ever economically disadvantaged (K–12)	-0.162* (0.063)	0.016 (0.032)	0.033 (0.031)
Had an IEP (K–12)	0.054 (0.103)	-0.027 (0.047)	-0.069 (0.042)
Ever English learner (K–12)	-0.042 (0.112)	-0.061 (0.053)	0.025 (0.058)
High achiever on state reading and math assessments in high school	0.197** (0.061)	-0.137*** (0.032)	-0.031 (0.031)
Attended suburban high school	-0.245*** (0.064)	0.074* (0.035)	-0.041 (0.036)
Attended rural high school	-0.340*** (0.085)	0.078 (0.047)	-0.057 (0.040)

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	Predictors of credit transfer rate	Predictors of taking same or lower course number in math	Predictors of taking same or lower course number in English
	Standardized coefficients with robust standard errors in parentheses	Marginal effects with robust standard errors in parentheses	
Dual-credit course is from university (vs community college)		0.077 (0.042)	0.247*** (0.049)
Math course number 105		0.270*** (0.081)	
Math course number 106		0.170 (0.122)	
Math course number 111		0.179*** (0.041)	
Math course number 113		0.036 (0.181)	
Math course number 243		0.543*** (0.028)	
Math course number 244		0.523*** (0.031)	
Math course number 251		0.380*** (0.045)	
Math course number 252		0.398*** (0.036)	
Math course number 253		0.275** (0.089)	
English course number 115			-0.146*** (0.031)
English course number 122			0.131** (0.044)
English course number 123			0.471* (0.196)
English course number 222			0.330 (0.310)

Continued on p. C-8

	Predictors of credit transfer rate	Predictors of taking same or lower course number in math	Predictors of taking same or lower course number in English
	Standardized coefficients with robust standard errors in parentheses	Marginal effects with robust standard errors in parentheses	
University 1	-0.314 (0.228)	0.210 (0.193)	-0.058 (0.080)
University 2	0.221 (0.211)	-0.093 (0.157)	-0.100 (0.057)
University 3	-0.160 (0.241)	-0.120 (0.148)	-0.194*** (0.026)
University 4	0.119 (0.219)	0.434 (0.277)	-0.092 (0.071)
University 5	0.130 (0.197)	0.322 (0.212)	no observations
University 6	0.346 (0.200)	0.218 (0.173)	-0.093 (0.074)
Community college 1		-0.056 (0.166)	-0.146*** (0.040)
Community college 2		-0.077 (0.163)	-0.172*** (0.031)
Community college 3		0.174 (0.172)	-0.163*** (0.037)
Community college 4		0.139 (0.177)	-0.115* (0.055)
Community college 5		0.161 (0.191)	-0.145*** (0.043)
Community college 6		0.318 (0.291)	0.123 (0.278)
Community college 7		-0.143 (0.168)	-0.168*** (0.036)
Community college 8		0.240 (0.187)	0.144 (0.128)

Continued on p. C-9

	Predictors of credit transfer rate	Predictors of taking same or lower course number in math	Predictors of taking same or lower course number in English
	Standardized coefficients with robust standard errors in parentheses	Marginal effects with robust standard errors in parentheses	
Community college 9		0.011 (0.172)	-0.154*** (0.036)
Community college 10		-0.122 (0.148)	-0.126** (0.049)
Community college 11		-0.098 (0.155)	-0.185*** (0.020)
Community college 12		0.186 (0.178)	-0.119* (0.049)
Community college 13		-0.043 (0.158)	-0.084 (0.065)
Community college 14		-0.121 (0.281)	-0.116 (0.084)
Community college 15		0.039 (0.165)	-0.176*** (0.038)
Constant	0.401 (0.660)		
Observations	4,030	1576	902
R-squared	0.024		

Note: Stars represent the following significance levels: *** p<0.001, ** p<0.01, * p<0.05.

Source: Authors' analysis of data from the Oregon Department of Education, Higher Education Coordinating Commission, and College Board.