Why Does High School Coursework Matter? The Case for Increasing Exposure to Advanced Courses

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Purpose

Increasing the rigor of courses taken in high school is a crucial part of education policy. Several initiatives aimed to increase curriculum rigor by expanding students' access to Advanced Placement (AP) and increasing course standards, including the No Child Left Behind Act of 2001, Race to the Top, and Common Core State Standards. Research has shown that the number and rigor of academic courses completed in high school are strong predictors of secondary and postsecondary attainment and success (Adelman, 2006; Leow et al., 2004; Long et al., 2012; Morgan et al., 2018). However, existing knowledge about high school coursework is outdated. It relies on data that were collected before initiatives such as Algebra for All, Race to the Top, and the Common Core State Standards took place.[1] Using data from a recent nationally representative data set, this brief reports results that expand our knowledge base on the relationship between a rigorous coursework and postsecondary outcomes.

Data

The data for the analyses reported are drawn from the restricted-use version of the High School Longitudinal Study of 2009 (HSLS:09), a nationally representative, longitudinal study of 24,000 students who were in ninth grade in fall 2009. The HSLS:09 surveyed students, their parents, mathematics and science teachers, school administrators, and school counselors. It included a direct measure of students' algebra skills in Grades 9 and 11. The first two collections occurred in the fall of the 2009 base year and in spring 2012, when most students were in 11th grade. Transcript data were collected from the schools in 2013, after most students had completed high school. The students were contacted again in 2016, 2 years after high school graduation, to learn of their educational and occupational experiences after leaving high school (National Center for Education Statistics, 2018).

[1] http://www.corestandards.org/wp-content/uploads/Math_Standards1.pdf; http://www.corestandards.org/wp-content/uploads/ELA_Standards1.pdf.

Findings

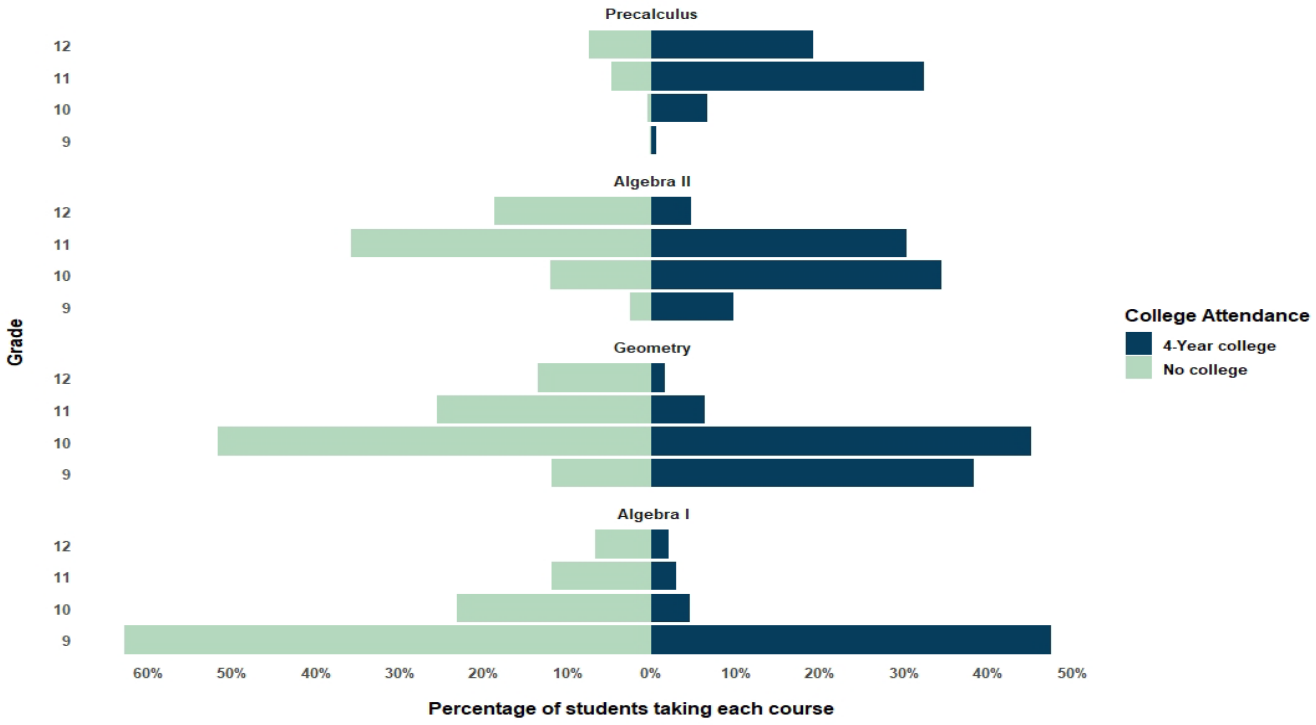
1. Timing of the course-taking matters.

Students who fall behind in taking courses in a timely manner have a reduced chance of enrolling in postsecondary education. Exhibits 1 through 3 display students' math, science, and English language arts (ELA) course-taking by grade in relation to postsecondary enrollment. In Exhibit 1, for example, we can make two observations for Algebra I course-taking. First, a majority of the students have taken Algebra I in Grade 9. Second, the likelihood of enrolling in a 4-year college (e.g., green bars) decreases when students take Algebra I after ninth grade.

As shown in Exhibits 1, 2, and 3, a student who does not take courses along the following timeline has substantially lower chances of enrolling in 4-year colleges:

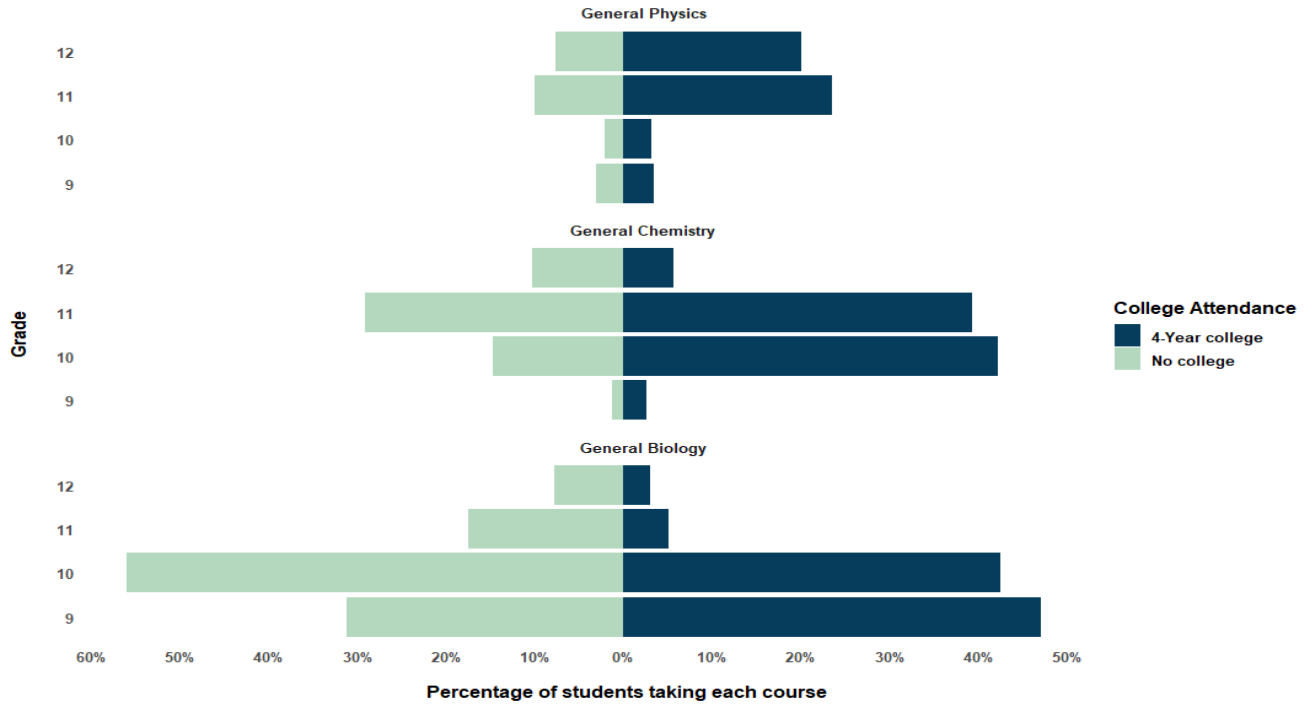
- Algebra I by ninth grade, Geometry by 10th grade, and Algebra II by 11th grade in math (Exhibit 1);
- General Biology by 10th grade and General Chemistry by 11th grade (Exhibit 2); and
- ELA I by ninth grade, ELA II by 10th grade, and ELA III by 11th grade (Exhibit 3).

Exhibit 1. Math Course-Taking Percentages and College Attendance by Grade for Select Courses



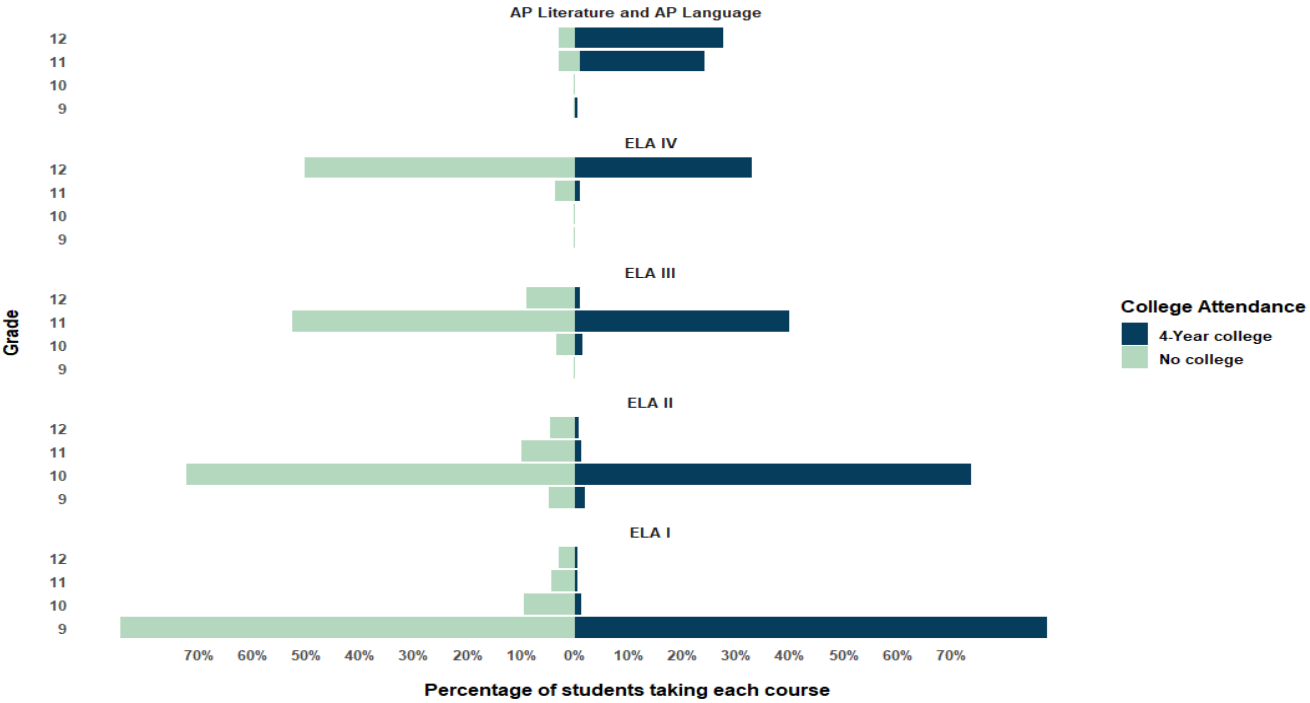
Note. Data are from the U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009.

Exhibit 2. Science Course-Taking Percentages and College Attendance by Grade for Select Courses



Note. Data are from the U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009.

Exhibit 3. ELA Course-Taking Percentages and College Attendance by Grade for Select Courses



Note. Data are from the U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009.

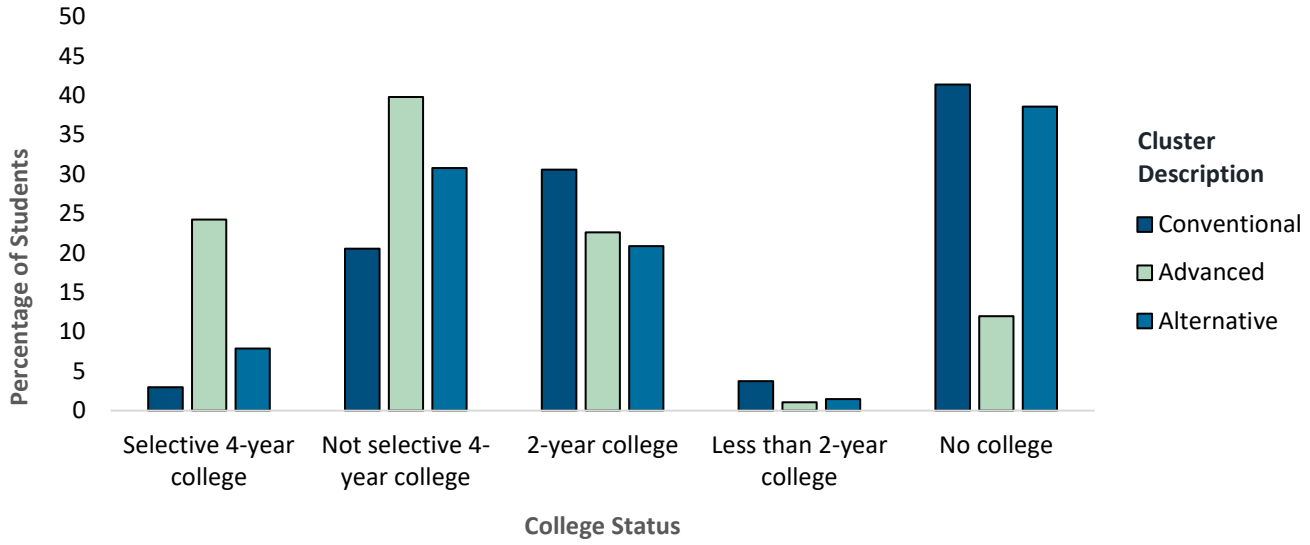
2. Advanced coursework is important.

Students who take advanced courses are likely to have better postsecondary outcomes (Exhibits 4, 5, and 6).

Students taking the advanced course-taking sequences as follows were most likely to enroll in selective and not selective 4-year colleges:

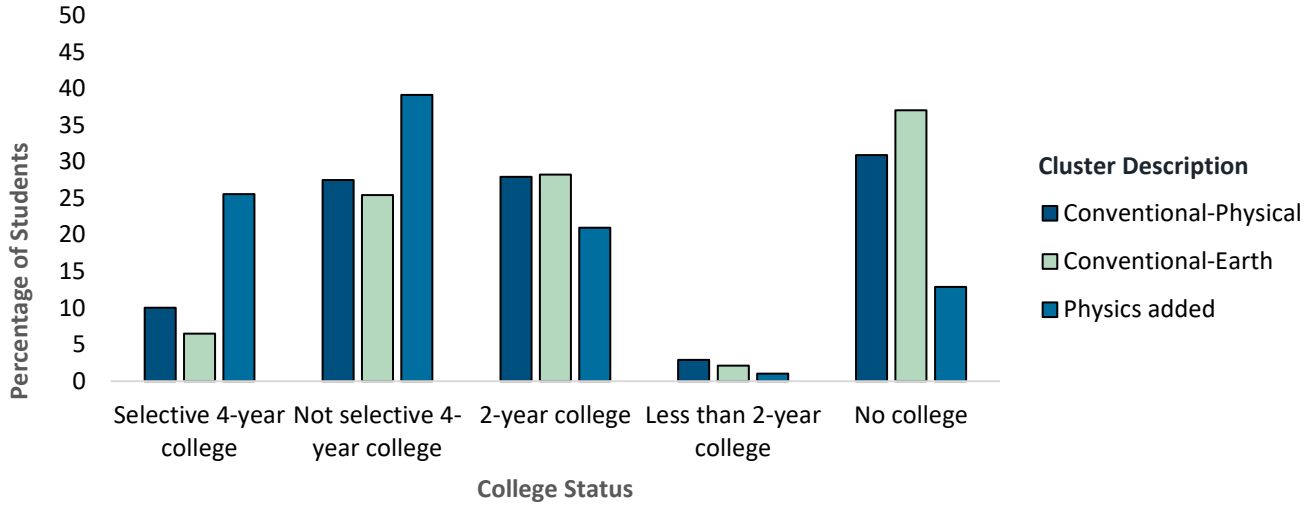
- Algebra I, Geometry, Algebra II, and Precalculus (math sequence; Exhibit 4);
- General Biology, General Chemistry, and General Physics (science sequence; Exhibit 5); and
- ELA I, ELA II, AP Language, and AP Literature (ELA sequence; Exhibit 6).

Exhibit 4. College Attendance Rates by Math Course-Taking Patterns



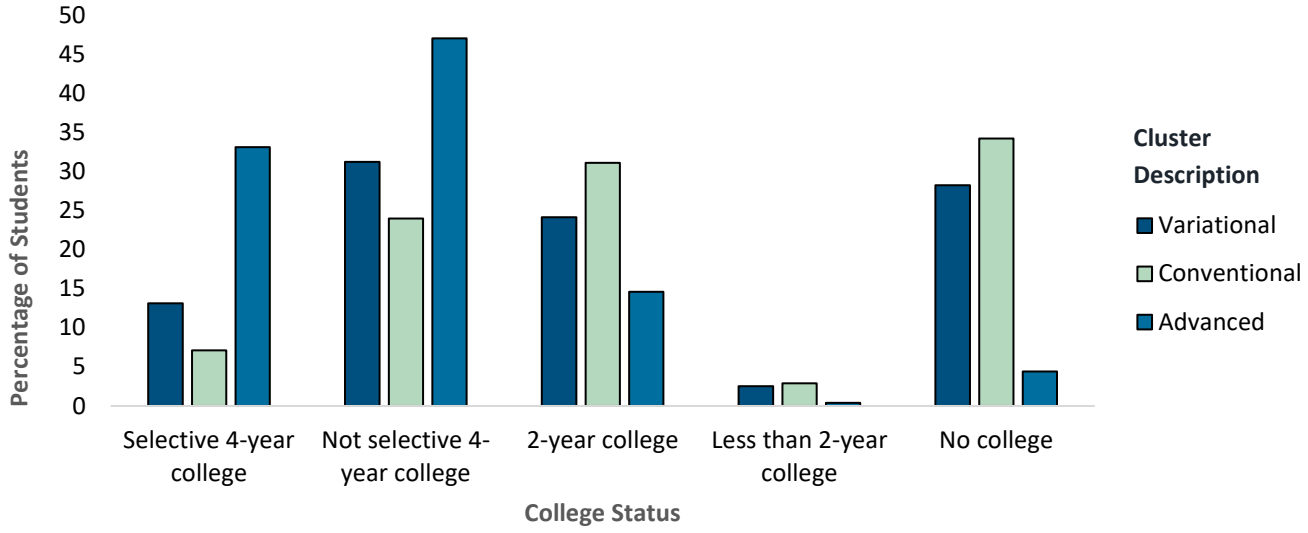
Note. The "Conventional" cluster includes Algebra I, Geometry, and Algebra II. The "Advanced" cluster includes Algebra I, Geometry, Algebra II, and Precalculus. The "Alternative" cluster includes another advanced math sequence. Data are from the U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009.

Exhibit 5. College Attendance Rates by Science Course-Taking Patterns



Note. "Conventional-Physical" includes the sequence Integrated Science, Physical Science and General Chemistry. "Conventional-Earth" includes the sequences (a) Physical Science, General Biology, General Chemistry, and (b) Earth Science, General Biology, and General Chemistry. "Physics added" includes the sequence General Biology, General Chemistry, and General Physics. Data are from the U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009.

Exhibit 6. College Attendance Rates by ELA Course-Taking Patterns



Note. "Variational" includes one of the following sequences: (a) ELA I, ELA II, and ELA III; (b) ELA I, ELA II, and American Literature; (c) ELA I, ELA II, American Literature, and British Literature; (d) ELA I, ELA II, ELA IV, American Literature, and British Literature; or (e) ELA I, ELA II, ELA III, ELA IV, and British Literature. "Conventional" includes the sequence: ELA I, ELA II, ELA III, and ELA IV. "Advanced" includes the sequence: ELA I, ELA II, AP Language, and AP Literature. Data are from U.S. Department of Education, National Center for Education Statistics, High School Longitudinal Study of 2009.

3. Students who take diverse courses are likely to have better postsecondary outcomes.

When coursework in math, science, ELA is used to predict postsecondary enrollment, we find that, in addition to taking advanced coursework in math, science, and ELA, taking a variety of courses in science is associated with better enrollment outcomes.

4. Both the quality and quantity of the coursework matters.

Results from quasi-experimental analyses show that measures of coursework rigor that emphasize the quality of coursework (e.g., level of advancement, Calculus, AP courses) have a higher correlation with postsecondary outcomes than measures that emphasize the quantity of coursework (credits earned). But, measures of coursework based on quantity are still significantly correlated with postsecondary outcomes.

Implications

The results of this study have implications for students, parents, educators, policymakers, and researchers.

1. Students and their parents who would like to increase students' chances of becoming successful after high school should ensure students do not fall behind in taking the specific courses outlined in this study. Students should enroll in advanced courses after completing the prerequisites for those courses.
2. Schools and districts can use the results from this study to modify their curricula by offering advanced courses that give their students an extra boost toward becoming college prepared. School districts could invest procedures or systems like early warning indicators to keep track of student progress.
3. Teachers and counselors can guide students in navigating the curriculum, mentor students who struggle, and offer encouragement about the importance of high school course-taking for all students and especially for those who do not have involved parents or knowledge of college requirements.
4. Policymakers must ensure that new initiatives focus on increasing both the quantity and the quality of the courses taken. The Algebra for All movement, for example, provides students opportunities to go beyond Algebra II to Precalculus or Calculus in high school, thereby increasing the intensity of their coursework. Similar initiatives should be developed for science and ELA courses.

Acknowledgments

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