

## REL Southwest Ask A REL Response

May 2020

### Question:

*Are there practices or policies that promote equity in enrollment in honors and advanced classes? What are the outcomes of those practices or policies?*

### Response:

Thank you for the question you submitted to our REL Reference Desk. We have prepared the following memo with research references to help answer your question. For each reference, we provide an abstract, excerpt, or summary written by the study's author or publisher. Following an established Regional Educational Laboratory (REL) Southwest research protocol, we conducted a search for research reports as well as descriptive study articles on practices and policies that promote equity in enrollment in honors and advanced classes, and on articles that examined outcomes of such practices or policies.

We have not evaluated the quality of references and the resources provided in this response. We offer them only for your reference. Also, we searched the references in the response from the most commonly used resources of research, but they are not comprehensive, and other relevant references and resources may exist. References provided are listed in alphabetical order, not necessarily in order of relevance. We do not include sources that are not freely available to the requestor.

### Research References

Allensworth, E., Nomi, T., Montgomery, N., & Lee, V. E. (2009). College preparatory curriculum for all: Academic consequences of requiring algebra and English I for ninth graders in Chicago, *Educational Evaluation and Policy Analysis*, 31(4), 367–391. <https://eric.ed.gov/?id=EJ866927>. Retrieved from <https://www.researchgate.net/publication/249795750>

*From the ERIC abstract:* “There is a national movement to universalize the high school curriculum so that all students graduate prepared for college. The present work evaluates a policy in Chicago that ended remedial classes and mandated college preparatory course work for all students. Based on an interrupted time-series cohort design with multiple comparisons, this study found that the policy reduced inequities in ninth grade course work by entering ability, race/ethnicity, and special education status. Although more students completed ninth grade with credits in algebra and English I, failure rates increased, grades slightly declined, test scores did not improve, and students were no more likely to enter college. In sum, few benefits resulted from universalizing college

preparatory course work among freshmen, but dropout rates did not increase. Possible explanations are discussed.”

Arshavsky, N., Edmunds, J. A., Miller, L. C., & Corritore, M. (2014). Success in the college preparatory mathematics pipeline: The role of policies and practices employed by three high school reform models. *School Effectiveness and School Improvement*, 25(4), 531–554. <https://eric.ed.gov/?id=EJ1034471>. Retrieved from [https://libres.uncg.edu/ir/uncg/f/J\\_Edmunds\\_Success\\_2014.pdf](https://libres.uncg.edu/ir/uncg/f/J_Edmunds_Success_2014.pdf)

*From the ERIC abstract:* “This paper examines the relationship of the policies and practices employed by 3 high school reform models—Early College High Schools, Redesigned High Schools, and High Schools That Work—with student success in college preparatory mathematics courses by the end of the 10th grade. Data on policies and practices collected through a survey of school principals in North Carolina are combined with administrative data on student course-taking and performance. The examined policies include course-taking requirements, rigorous instruction, academic support, personalization, and relevance. Results show that implementation of these policies varies across models and that higher levels of implementation of combinations of these policies are associated with improved outcomes.”

Booth, E., Shields, J., & Carle, J. (2017). *Advanced course completion rates among New Mexico high school students following changes in graduation requirements* (REL 2018-278). Washington, D.C.: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Southwest. <https://eric.ed.gov/?id=ED576303>

*From the ERIC abstract:* “In 2008 New Mexico changed its graduation requirements for regular education high school students who completed more than their senior year of high school in a New Mexico public school. Students who entered high school in 2009 were the first to have to complete (pass with a D or better) at least one advanced course (a course designated by the New Mexico Public Education Department as an honors or gifted and talented course or designated by the school district as an advanced, Advanced Placement, gifted and talented, honors, or International Baccalaureate course), dual-credit course, or distance learning course. Numerous studies have shown the positive academic outcomes—such as higher high school graduation and postsecondary enrollment and persistence rates—associated with completing advanced courses. This study examines advanced course completion rates (the percentages of students who completed zero, one, and two or more advanced courses) among New Mexico public high school students in the first three cohorts subject to the state’s new graduation requirements to identify whether gaps exist in the state and across student and school characteristics. It uses data on students who entered grade 9 in 2009-11 and remained enrolled for four years. The student characteristics examined were race/ethnicity, grade 8 standards-based assessment performance in math, eligibility for the federal school lunch program, and English learner status; the school characteristics examined were performance rating, size, Title I status, and urbanicity. The findings may help New Mexico policymakers and practitioners understand the extent to which traditionally underserved populations complete advanced courses in high school. The study found that over 56 percent of New Mexico students

completed at least one advanced course in high school but that gaps exist across racial/ethnic groups. White students were more likely than American Indian students and Hispanic students to complete an advanced course. The gap in the advanced course completion rate between White students and American Indian students was 17 percentage points, and the gap between White students and Hispanic students was 14 percentage points. The gaps across racial/ethnic groups were smaller when high-performing students (those who received a score of met expectations or exceeded expectations in math on the state's grade 8 standards-based assessment) were examined separately. When high-performing students were examined separately, the gap between White students and American Indian students was 6 percentage points, and the gap between White students and Hispanic students was 4 percentage points. The percentage was much lower among lower performing students (51 percent among lower performing American Indian students, 52 percent among lower performing Hispanic students, and 64 percent among lower performing White students), and substantial gaps remained across racial/ethnic subgroups. The study also found that advanced course completion rates were related to school characteristics. The percentage of students who completed at least one advanced course was higher among students at schools with a performance rating of A on the state's A-F scale than among students at schools with a lower rating. The percentage who completed multiple advanced courses was substantially lower among students at small schools (those with fewer than 750 students) than among students at bigger schools. The gaps remained when high-performing students were examined separately. The percentage who completed at least one advanced course was lower among high-performing students at small schools than among high-performing students at bigger schools. Although this study was not designed to investigate the causes of gaps in advanced course completion rates, identifying the gaps across student and school characteristics is a first step in helping members of the New Mexico Achievement Gap Research Alliance develop strategies to reach traditionally underserved students. The next step could be to investigate areas for improvement in approaches to promoting awareness of the availability and benefits of advanced course completion among American Indian and Hispanic students. The finding that a large share of these students do not complete advanced courses highlights the need to further investigate the extent to which advanced courses are available to students across the state, particularly in small schools and schools with low performance ratings.”

Dalton, B., Ingels, S. J., Downing, J., & Bozick, R. (2007). *Advanced mathematics and science coursetaking in the spring high school senior classes of 1982, 1992, and 2004. Statistical Analysis Report* (NCES 2007-312). Washington, D.C.: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics.  
<https://eric.ed.gov/?id=ED497754>

*From the ERIC abstract:* “While increased academic requirements for high school graduation have long been advocated, current research shows a mixed record in mathematics and science achievement among American middle and high school students relative to some of their international peers. In response to these concerns and other calls for reform, states have increased the number of courses required for a high school diploma. Research using high school transcripts collected by the National Center for Education Statistics (NCES) indicates that states have been successful in encouraging

students to take more courses in science and mathematics before graduation; however, important questions remain about trends in mathematics and science coursetaking. Are more students taking higher level courses in mathematics and science, in addition to increasing the number of courses taken? Have upward trends in coursetaking been sustained in recent years? And have disparities among student subgroups in coursetaking experiences changed over time? This report uses in-depth information on the coursetaking patterns of high school graduates in 1982, 1992, and 2004 to answer these questions. The data show that high school graduates' completion of mathematics courses clearly increased across the three cohorts studied in this report. Graduates came much closer to taking 4 full years of academic coursework in mathematics, moving from, on average, 2.7 total credits in mathematics in 1982 to 3.6 total credits in 2004. In addition, graduates shifted from taking lower level mathematics courses to taking more advanced courses. Accompanying the increase in advanced-level mathematics coursetaking was a significant drop in the percentage finishing high school with one of the two lowest levels of mathematics courses completed. Clear trends were also evident for science coursetaking. The average number of science credits increased from 2.2 total credits in 1982 to 3.3 total credits in 2004. Further, graduates shifted in significant proportions from taking lower level science courses to taking upper level ones. In addition to these overall trends in coursetaking, the number and level of courses taken in mathematics and science increased for all student subgroups examined. Across categories of sex, race/ethnicity, socioeconomic status (SES) background, educational expectations, and school sector, graduates in 2004 took more and higher levels of mathematics and science than their peers in 1992 and 1982.”

Daun-Barnett, N., & St. John, E. P. (2012). Constrained curriculum in high schools: The changing math standards and student achievement, high school graduation and college continuation. *Education Policy Analysis Archives*, 20(5).  
<https://eric.ed.gov/?id=EJ971424>

*From the ERIC abstract:* “Mathematics education is a critical public policy issue in the U.S. and the pressures facing students and schools are compounded by increasing expectations for college attendance after high school. In this study, we examine whether policy efforts to constrain the high school curriculum in terms of course requirements and mandatory exit exams affects three educational outcomes—test scores on SAT math, high school completion, and college continuation rates. We employ two complementary analytic methods—fixed effects and difference in differences (DID)—on panel data for all 50 states from 1990 to 2008. Our findings suggest that within states both policies may prevent some students from completing high school, particularly in the near term, but both policies appear to increase the proportion of students who continue on to college if they do graduate from high school. The DID analyses provide more support for math course requirement policies than mandatory exit exams, but the effects are modest. Both the DID and fixed effects analyses confirm the importance of school funding in the improvement of high school graduation rates and test scores.”

Domina, T., Hanselman, P., Hwang, N., & McEachin, A. (2016). Detracking and tracking up: Mathematics course placements in California middle schools, 2003–2013. *American Educational Research Journal*, 53(4), 1229–1266. <https://eric.ed.gov/?q=ED577945>

*From the ERIC abstract:* “Between 2003 and 2013, the proportion of California eighth graders enrolled in algebra or a more advanced course nearly doubled to 65%. In this article, we consider the organizational processes that accompanied this curricular intensification. Facing a complex set of accountability, institutional, technical/functional, and internal political pressures, California schools responded to the algebra-for-all effort in diverse ways. While some schools detracked by enrolling all eighth graders in algebra, others ‘tracked up’ creating more advanced geometry opportunities while increasing algebra enrollments. These responses created a new differentiated course structure that is likely to benefit advantaged students. Consistent with the effectively maintained inequality hypothesis, we find that detracking occurred primarily in disadvantaged schools while “tracking up” occurred primarily in advantaged schools.”

Domina, T., & Saldana, J. (2012). Does raising the bar level the playing field?: Mathematics curricular intensification and inequality in American high schools, 1982-2004. *American Educational Research Journal*, 49(4), 685–708. <https://eric.ed.gov/?id=EJ976561>. Retrieved from <https://researchgate.net/publication/239769985>

*From the ERIC abstract:* “Over the past three decades, American high school students’ course taking has rapidly intensified. Between 1982 and 2004, for example, the proportion of high school graduates who earned credit in precalculus or calculus more than tripled. In this article, the authors investigate the consequences of mathematics curricular intensification for social stratification in American high schools. Using representative data from U.S. high school graduates in 1982, 1992, and 2004, the authors estimate changes in race-, class-, and skills-based inequality in advanced math course credit completion. Their analyses indicate that race, class, and skills gaps in geometry, Algebra II, and trigonometry completion have narrowed considerably over the study period. However, consistent with the theory of maximally maintained inequality, inequalities in calculus completion remain pronounced.”

Kim, S., Wallsworth, G., Xu, R., Schneider, B., Frank, K., Jacob, B., et. al. (2019). The impact of the Michigan Merit Curriculum on high school math course-taking. *Educational Evaluation and Policy Analysis*, 41(2), 164–188. <https://eric.ed.gov/?id=EJ1213935>. Retrieved from [https://www.bridgemi.com/sites/default/files/the\\_impact\\_of\\_the\\_michigan\\_merit\\_curriculum\\_on\\_high\\_school\\_math\\_course-taking.pdf](https://www.bridgemi.com/sites/default/files/the_impact_of_the_michigan_merit_curriculum_on_high_school_math_course-taking.pdf)

*From the ERIC abstract:* “Michigan Merit Curriculum (MMC) is a statewide college-preparatory policy that applies to the high school graduating class of 2011 and later. Using detailed Michigan high school transcript data, this article examines the effect of the MMC on various students’ course-taking and achievement outcomes. Our analyses suggest that (a) post-MMC cohorts took and passed approximately 0.2 additional years’ of math courses, and students at low socioeconomic status (SES) schools drove nearly all of these effects; (b) post-policy students also completed higher-level courses, with the largest increase among the least prepared students; (c) we did not find strong evidence on students’ ACT math scores; and (d) we found an increase in college enrollment rates for post-MMC cohorts, and the increase is mostly driven by well-prepared students.”

Walston, J., Tucker, C., Ye, C., & Lee, D. H. (2017). *Graduation exam participation and performance, graduation rates, and advanced coursetaking following changes in New Mexico graduation requirements, 2011-15* (REL 2018-277). Washington, D.C.: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Southwest. <https://eric.ed.gov/?id=ED576327>

*From the ERIC abstract:* “The New Mexico graduation rate has lagged behind the national graduation rate in recent years. In 2015 the graduation rate was 69 percent in New Mexico and 83 percent nationwide (New Mexico Public Education Department, 2016; U.S. Department of Education, 2017). Of particular interest to education leaders in New Mexico are differences in graduation rates among American Indian (63 percent in 2015), Hispanic (67 percent), and White students (74 percent). Improving graduation rates among all student subgroups is a priority for New Mexico, as is ensuring that all students have the math and science knowledge and skills required for success in the 21st century workplace or in postsecondary education. This study responds to the Regional Educational Laboratory Southwest New Mexico Achievement Gap Research Alliance’s and the New Mexico Public Education Department’s interest in student performance on the graduation exam and in graduation rates among students at various levels of performance on the exam. The alliance and the department were also interested in patterns of enrollment in Algebra II and lab science courses, along with the four-year graduation rate among students who take and those who do not take these additional courses. The study reports student participation in the graduation exam and proficiency rates (the percentage of students who score proficient or better) for each section and provides the four-year graduation rate among the last cohort that took the old exam (the 2011 cohort) and among the four cohorts that took the new exam (the 2012-15 cohorts). The study also reports the percentage of students who took Algebra II and two lab science courses and the graduation rate among the 2014 and 2015 cohorts, which were subject to the new math and science course requirements. Results are reported by cohort overall and by gender, race/ethnicity, eligibility for the federal school lunch program (a proxy for socioeconomic deprivation), and English learner status. The study does not provide evidence on the causal impact of the changes to graduation requirements. Changes to graduation requirements, such as the ones enacted in New Mexico, are usually intended to motivate positive change, such as better student performance and higher enrollment in more-challenging courses. The study findings show that the overall direction of change is positive for graduation exam performance, advanced course enrollment, and graduation rates but that differences exist across subgroups. The differences may have implications for targeting resources and services to students most in need of support for staying in school and fulfilling graduation requirements.”

Yoon, S. Y., & Strobel, J. (2017). Trends in Texas high school student enrollment in mathematics, science, and CTE-STEM courses. *International Journal of STEM Education*, 4(9), 1–23. <https://eric.ed.gov/?id=EJ1181913>. Retrieved from <https://stemeducationjournal.springeropen.com/track/pdf/10.1186/s40594-017-0063-6>

*From the ERIC abstract:* “Background: In the context of Texas of the USA, House Bill 5 signifies a major policy shift requiring entering high school students starting in fall 2014 to

choose an endorsement, like science, technology, engineering, and mathematics (STEM) being one of them, to provide students with earlier exposure to a coherent course sequence. As we barely understand students' choices before the endorsement requirement, this study explored 6 years of data (2008-2013) on high school student enrollment rates in mathematics, science, and career and technical education (CTE)-STEM courses to set out the baseline of the trends in STEM course enrollment in Texas. Results: The enrollment rates of the STEM-related courses had wide variations by types of courses, gender, and race/ethnicity. Overall, student enrollment rates increased across time in selective and advanced mathematics, science, and CTE-STEM courses, which indicates a promising prospect for the STEM pipeline. However, there were exceptions in several courses with gender and racial/ethnic differences in the trends. Gender disparity was greater in advanced science courses than advanced mathematics courses, and collectively, gender gap in CTE-STEM courses increased greater than advanced mathematics and advanced science courses across years. While racial/ethnic differences were constant across years in both advanced mathematics and advanced science courses, the differences were rising in CTE-STEM courses in recent years. Conclusions: As little is known about students' preferences in course-taking in STEM courses at the state level, the findings on the trends in students' STEM course-taking, disaggregated by gender and race/ethnicity, can provide needed insights on what institutional K-12 changes would be effective for impacting the STEM pipeline."

## Additional Organization to Consult

The Education Trust – <https://edtrust.org/>

*From the website:* "The Education Trust is a national nonprofit that works to close opportunity gaps that disproportionately affect students of color and students from low-income families. Through our research and advocacy, Ed Trust supports efforts that expand excellence and equity in education from preschool through college, increase college access and completion particularly for historically underserved students, engage diverse communities dedicated to education equity, and increase political and public will to act on equity issues."

## Methods

### Keywords and Search Strings

The following keywords and search strings were used to search the reference databases and other sources:

- advanced academic participation
- advanced high school course access and policy making
- (“equity” AND “advanced courses”)
- (“equity” AND “honors courses”)
- (“equity” AND “gifted courses”)
- (“equity” AND “advanced STEM”)
- [(“equity”) AND (“IB courses” OR “international baccalaureate courses”)]
- [(“equity”) AND (“AP courses” OR “advanced placement courses”)]

- [ (“policy”) AND (“advanced courses” OR “advanced course-taking”)]
- [ (“enrollment”) AND (“advanced courses” OR “advanced course-taking”)]
- [ (“diverse” AND “enrollment”) AND (“advanced courses” OR “advanced course-taking”)]
- [ (“disparities”) AND (“advanced courses” OR “advanced course-taking”)]
- (“black-white gap” AND “advanced course-taking”)
- (“ethnic gap” AND “advanced course-taking”)
- [ (“curricular intensification”) AND (“advanced courses” OR “advanced course-taking”)]

### Databases and Resources

We searched [ERIC](#) for relevant, peer-reviewed research references. ERIC is a free online library of more than 1.8 million citations of education research sponsored by the Institute of Education Sciences (IES). Additionally, we searched the [What Works Clearinghouse](#).

### Reference Search and Selection Criteria

When we were searching and reviewing resources, we considered the following criteria:

- *Date of the publication:* References and resources published from 2005 to present, were included in the search and review.
- *Search priorities of reference sources:* Search priority is given to study reports, briefs, and other documents that are published and/or reviewed by IES and other federal or federally funded organizations, academic databases, including ERIC, EBSCO databases, JSTOR database, PsychInfo, PsychArticle, and Google Scholar.
- *Methodology:* The following methodological priorities/considerations were given in the review and selection of the references: (a) study types—randomized control trials, quasi-experiments, correlational studies, descriptive data analyses, literature reviews, mixed methods analyses, and so forth; (b) target population, samples (representativeness of the target population, sample size, volunteered or randomly selected, and so forth), study duration, and so forth; and (c) limitations, generalizability of the findings and conclusions, and so forth.

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This memorandum is one in a series of quick-turnaround responses to specific questions posed by stakeholders in the Southwest Region (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas), which is served by the Regional Educational Laboratory (REL) Southwest at AIR. This memorandum was prepared by REL Southwest under a contract with the U.S. Department of Education’s Institute of Education Sciences (IES), Contract ED-IES-91990018C0002, administered by AIR. Its content does not necessarily reflect the views or policies of IES or the U.S. Department of Education nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.