

RISE AND FALL OF TEXAS STEM EDUCATION

COLLEGE READINESS AND COURSE-TAKING SINCE HOUSE BILL 5 OF 2013

EXECUTIVE SUMMARY

Michael Marder, Executive Director of UTeach and Professor in the Department of Physics
The University of Texas at Austin
March 2018

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House Bill 5 of 2013 was the most important education bill in Texas of the last decade. It greatly reduced high-stakes testing in Texas high schools and changed high school graduation requirements to accommodate students who intend to bypass a four-year college degree and go directly into the workforce, with or without formal post-secondary training.

The first class whose whole high school career was set by HB5 is the class of 2018. They have not yet graduated. However, many provisions of the bill kicked in as soon as the fall of 2013. We know the courses that students have been taking as they go through high school, and we know how they have done on tests along the way, so the picture of how Texas education looks after HB5 is coming into focus.

Proponents of HB5 argued at the time that the state's new workforce-centric diplomas were not better or worse than the previous ones—just different. Here are results so far, focusing on STEM—some of which are good, but most of which are bad, neutral, or mixed.

- **Good.** High school graduation rates have continued to increase, slowly and steadily, and remain among the best in the nation, overall and by subgroup.
- **Bad.** There is a rapid and alarming drop in post-secondary opportunities for Texas students overall. The drop affects all groups, but is particularly severe for students in schools of concentrated poverty, and for Black and Hispanic students.
- **Neutral.** Though Algebra II became optional, the rate at which students take that course has not dropped much, because the alternatives for it are less attractive. Physics and Chemistry also become optional, and the rate at which students take them has not dropped much, either.
- **Mixed.** The percentage of students taking Computer Science, Statistics, and Robotics is growing exponentially. However, for Computer Science and Statistics, these gains are overwhelmingly concentrated in schools of low poverty.

Thus, while continuing to drive up the percentage of students who obtain a high school diploma, Texas is allowing the value of the diploma to degrade. The freedom HB5 gave students to pursue their interests is almost exclusively benefiting students in low-poverty schools. Students face decreased post-secondary opportunities overall, and the decrease is most severe for Black, Hispanic, and low-income students.

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BACKGROUND

From the late 1990s until 2010, Texas implemented educational policies that worked over many years to increase student success in measures of college and career readiness while at the same time improving graduation rates.

In 2011, substantial budget cuts reduced funding to the public schools and, in particular, reduced expenditure on programs designed to help students struggling academically. In 2013, the state passed HB5, which changed requirements for testing and graduation. Mandatory exams that students had used to demonstrate college readiness all became optional. Algebra II, Physics, and Chemistry courses also moved from being required in the default graduation plan to being optional. (See Table 1.)

Some motivations for HB5 were to reduce the pressure of the high-stakes testing system on students, teachers, and schools, and to provide students with freedom to pursue subjects that interested them rather than making most students follow a rigid curriculum with relatively few electives.

It is difficult to argue with these intentions. However, the reforms of the previous two decades also had been motivated by good intentions, which were to use the pressure of the testing and accountability system to impose steadily rising standards on a public education system with a poor record of serving low-income, Hispanic, and Black students. Over the course of more than a decade, this pressure had produced positive results, although significant gaps in education and opportunity between economic, racial, and ethnic groups never went away. Thus, it is important to monitor the consequences of changes in testing and graduation requirements to see whether gaps continue to diminish or grow and whether opportunity increases or decreases.

POST-SECONDARY OPPORTUNITY

Post-secondary opportunity rose from 2006 until 2013 and then plummeted for Texas high school graduates in 2016. This is the result of a drop in the official College Readiness Certification rate, shown in Figure 1, which breaks down the results by schools with different levels of poverty concentration.

College Readiness Certification is the name for a particular college readiness measure that the Texas Education Agency prepares for every Texas high school graduate as part of the Texas Success Initiative (TSI). For students who entered high school prior to 2011, there were several ways to be certified College Ready. They could get scores above a cutoff on the mandatory TAKS exams their junior year. They could get above 1110 on the SAT or 24 on the ACT. Or they could complete a college course or receive honorable discharge from military service. Far and away the most likely way to get the certification was through scores on the mandatory state tests.

The story behind the rising rate of College Readiness Certification from 2006 until 2014 in Figure 1 is that more and more students successfully met a benchmark on the exit-level TAKS. When Texas transitioned from TAKS to STAAR in 2011, the exams designed to take over the college certification task were Algebra II and English III.

Under HB5, Algebra II and English III became optional for districts to offer, they disappeared from the annual testing calendar, and only a trickle of results from them have been reported since 2012–2013. Schools were encouraged to have students take the Texas Success Initiative Assessment (TSIA) while still in high school. However, students were not required to take it, and this is the main reason that College Readiness Certification rates plummeted.

Table 1: Graduation plans over time.

Year	Graduation plan for entering <i>freshmen</i>	Graduation plan recommended for high school <i>graduates</i>	Mandatory high school tests for <i>freshmen</i>	Mandatory high school tests for <i>graduates</i>
2006-2007	Recommended: 4 English, 3 math, 3 science, 3.5 social studies	4 English, 3 math, 3 science, 3.5 social studies	TAKS	TAKS
2007-2008	Recommended: 4x4	4 English, 3 math, 3 science, 3.5 social studies	TAKS	TAKS
2008-2009	Recommended: 4x4	4 English, 3 math, 3 science, 3.5 social studies	TAKS	TAKS
2009-2010	Recommended: 4x4	4 English, 3 math, 3 science, 3.5 social studies	TAKS	TAKS
2010-2011	Recommended: 4x4	4x4	TAKS	TAKS
2011-2012	Recommended: 4x4	4x4	STAAR (15 tests)	TAKS
2012-2013	Recommended: 4x4	4x4	STAAR (15 tests)	TAKS
2013-2014	Transition: Foundation+Endorsement, 4x4 all available	4x4	STAAR (5 tests)	TAKS
2014-2015	Foundation+Endorsement	4x4	STAAR (5 tests)	STAAR (15 tests, dropped to 5 junior year)
2015-2016	Foundation+Endorsement	Students entered under 4x4, but had available Foundation+Endorsement or Distinguished	STAAR (5 tests)	STAAR (15 tests, dropped to 5 sophomore year)
2016-2017	Foundation+Endorsement	Students chose between 4x4 or Foundation+Endorsement on entry	STAAR (5 tests)	STAAR (5 tests)
2017-2018	Foundation+Endorsement	First cohort only choosing between Foundation+Endorsement or Distinguished	STAAR (5 tests)	STAAR (5 tests)

Source: Texas Education Agency. State graduation requirements. Available at <http://tea.texas.gov/graduation.aspx>.

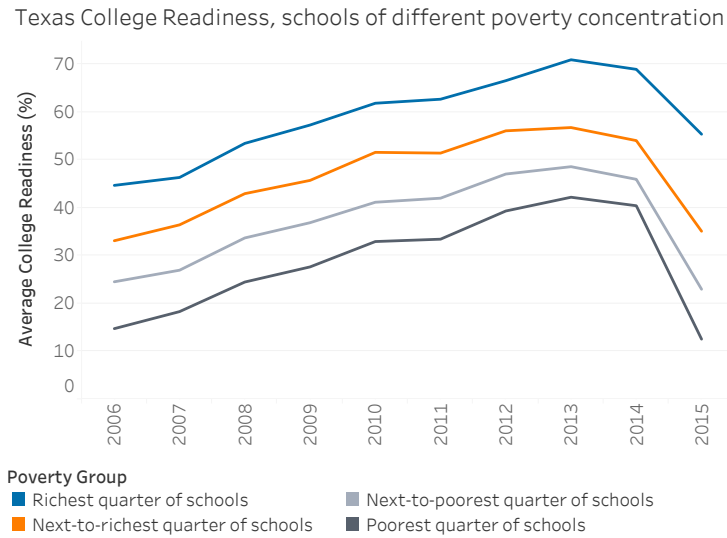


Figure 1: College Readiness Certification of graduating Texas high school seniors from 2007 to 2016, disaggregated by school poverty concentration. Source: Texas Education Agency, AEIS, and TAPR.

For graduates from the quarter of schools with the lowest concentration of low-income students, College Readiness Certification fell from a peak of 71% to 55% in 2015–2016. For graduates from the quarter of schools where poverty is most highly concentrated, College Readiness Certification dropped from the peak of 42% to 13% in 2015–2016. Figure 2 shows College Readiness Certification for various racial, ethnic, and economic groups. The drop in College Readiness Certification was most severe for Black students, for whom it fell from a peak of 42% to 17% in 2015–2016. It was least severe for White students, for whom it fell from a peak of 71% to 55% in 2015–2016.

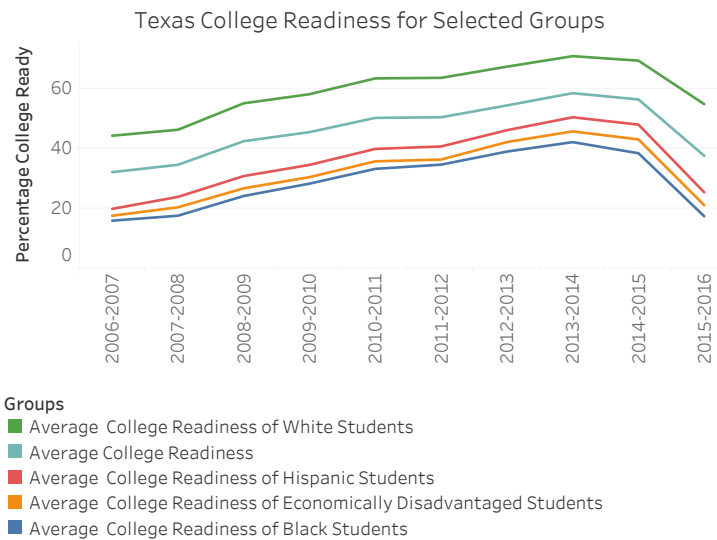


Figure 2: College Readiness Certification of graduating Texas high school seniors from 2007 to 2016, disaggregated by racial, ethnic, and economic groups. Source: Texas Education Agency, AEIS, and TAPR.

This drop in College Readiness Certification will have serious consequences for students. It is not just an arbitrary opinion about which students are ready for college. It is actually a hidden college admissions requirement. It is hidden because technically it is not an admissions requirement at all. Colleges are forbidden from using it as part of the admissions process. High school graduates can enroll in any community college, and many four-year colleges are open to all high school graduates as well. However, although students are admitted, they can be barred from coursework that leads to a

long-term certificate or degree until they are College Ready Certified in mathematics, reading, and writing. The students are admitted, but they are required to spend time and money on coursework at the high school level that will not count toward their degree until they are officially ready for freshman-level courses.

The severity of this hidden entrance requirement is softened by the fact that colleges are under order to help students overcome it, but even so, the odds are daunting. If a student comes out of high school without being College Ready, then upon walking into a community college, he is supposed to take the Texas Success Initiative Assessment (TSIA). Mathematics poses the highest barrier. The chances of passing the mathematics portion of this assessment are around 20%. Students who do not pass the mathematics or reading exams must enroll in developmental education courses. Of those who enroll in developmental education, less than half complete the coursework successfully, and, of those, only half complete their first college-level mathematics course. The net result is that only 15% of students who enter college without being College Ready in mathematics get through a mathematics requirement for their degree within two years. Even before the latest drop in College Readiness Certification, more than 60% of students at two-year colleges were enrolling without being College Ready.¹

As the rising wave of students leaving high school being College Ready enters two-year colleges over the next several years, they will be required to take the TSIA, and there is no reason to think that the fraction who pass the exam or succeed in developmental education courses will rise in comparison to the past. The fraction of students obtaining post-secondary degrees and long-term certificates is very likely to decline. This development is particularly unwelcome in light of an ambitious plan launched in 2015 “whose major goal is that 60 percent of young Texans will hold a certificate or degree by 2030.”² The baseline year was 2015, when 41 percent of young Texans held a certificate or degree. Increasing this percentage was acknowledged to be difficult at a time when College Readiness Certification had been rising for a decade. Reaching the goals of 60x30 while it is dropping is difficult to imagine.

Despite the fact that a central educational goal of Texas is slipping out of reach, there is no sign of action to remedy the problem. This is explained by official responses to the drop in College Readiness Certification rates.

HB5 included a requirement that its outcomes be monitored. The Texas Education Agency, Texas Workforce Commission, and Texas Higher Education Coordinating Board were required to monitor “high school graduation rates, college readiness, college admissions, college completion, obtainment of workforce certificates, employment rates, and earnings.”³ This task was assigned to American Institutes for Research, who produced an interim report in the fall of 2015⁴ and a final report in December 2017.

The AIR interim report does an excellent job of summarizing the history of Texas accountability and testing requirements. It shows how important indicators such as College Readiness Certification and graduation rates have varied over time. It includes results of a comprehensive survey of districts, providing a valuable record of district actions in response to HB5 up through 2015.

The AIR report authors observe in footnote 15 that, “Although the STAAR Algebra II and English III assessments are scheduled to be administered again in 2015–2016, they are optional for districts.” However, Algebra II and English III did

¹ Texas Higher Education Coordinating Board. (2017). 2017 Texas public higher education almanac (report). Austin: Author. Available at: <http://www.thecb.state.tx.us/reports/PDF/9435.PDF?CFID=64117197&CFTOKEN=93556140>.

² Texas Higher Education Coordinating Board. (2017). 2017 Texas public higher education almanac (webpage). Available at: <http://www.thecb.state.tx.us/index.cfm?objectid=DDEEF064-B397-9EBA-773779AAC15507B4>.

³ Texas Education Agency. Program evaluation: Research reports. Available at: http://tea.texas.gov/Reports_and_Data/Program_Evaluations/Research_Reports/Program_Evaluation___Research_Reports.

⁴ American Institutes for Research. (2015). House Bill 5 evaluation. Austin: Author. Available at: <http://tea.texas.gov/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=25769823287&libID=25769823385>

not appear on the STAAR testing calendar after 2012–2013, and no results from these tests appeared after that year in state data releases until 2015–2016, when a small fraction of the state’s students were reported to be taking it again.

The final state-supported AIR report was issued in December 2017. From the Executive Summary of that report⁵:

Because of the significant changes in testing requirements for the 2011–12 cohort, their measured TSI [Texas Success Initiative] readiness rates cannot be directly compared to rates of earlier cohorts for the purpose of describing trends in true college readiness. The 2011–12 incoming Grade 9 cohort was the first cohort where the option to meet TSI readiness standards by achieving at or above the HERC score on an exit-level TAKS was eliminated when the STAAR replaced TAKS as the state’s standardized student assessment.

In the body of the report, there is the acknowledgment: “While it is beyond the scope of this report to determine the direct effects of changes in testing requirements on TSI readiness rates, stakeholders are still met with tangible and significant impacts associated with these observed rates.”

Although the consequences of College Readiness Certification for students and for the state are very real, the main problem is more technical than substantive. What high school graduates actually know and can do almost certainly did not change much between 2014–2015 and 2015–2016. What *has* changed is what they *proved* that they know and can do. Thus, despite the negative consequences for students individually and for the state in general, there is no sense of urgency to fix the problem. This seems to be because of the sentiment that “true” college readiness has not changed. Unfortunately, “true” college readiness will not get students through college, for the official state measures of College Readiness Certification will prevent them from taking credit-bearing courses.

COURSE-TAKING IN STEM

College readiness can be measured in many ways. The official measure I just discussed is one, but this is certainly not the best way to decide if schools and teachers have prepared students for college. It has changed greatly over time, and it also need not correspond well to whether students who go to college actually succeed. Another way to look at college readiness is through the courses that students take. This type of college readiness also has administrative consequences for students. It is connected to college admission. Only students who graduate on the Distinguished Plan are eligible for automatic college admission under the top 10% rule, and the Distinguished Plan requires passing Algebra II, Chemistry, and Physics. Most four-year colleges either require these courses for admission or strongly encourage them

I examined STEM course-taking patterns to see if they have been changing. STEM courses are notoriously challenging for students, and they present challenges for schools as well. Physics teachers regularly lead the list of the hardest teachers to hire, with Chemistry and mathematics not far behind. The decades-long push to increase college readiness in Texas that peaked in 2013–2014 included a push to staff Physics, Chemistry, and advanced mathematics courses in high school. In contrast with the collapse in College Readiness Certification that in principle could be cured with the administration of new tests, a decline in the ability to teach STEM subjects would mean a much more substantial loss in student accomplishment and school infrastructure. Yet such a decline can be expected because HB5 made Algebra II, Physics, and Chemistry optional.⁶

⁵ American Institutes for Research. (2017). House Bill 5 evaluation: Final report. Austin: Author. Available at: <https://tea.texas.gov/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=51539618631&libID=51539618631>.

⁶ The case of Algebra II is complicated because students must still choose a mathematics course from a list on which Algebra II is arguably the easiest and most familiar. This resulted from a deliberate effort behind the scenes to steer students toward Algebra II. There was no similar effort directed toward Physics and Chemistry; students can satisfy their physical science requirement with an Integrated Physics/Chemistry class that is at a lower level than either Physics or Chemistry.

Definitive information about the consequences of HB5 for course-taking will not exist until the class that entered high school in the fall of 2014 graduates in the spring of 2018, and those data will not become available until 2019. Still, students have advanced far enough in high school with the provisions of HB5 in effect that preliminary statements about course-taking are possible.

Overall, the news here is promising. There has not been a sharp drop in the numbers of students taking STEM courses. I provide two separate views of the situation: longitudinal by cohort and snapshot by year.

LONGITUDINAL COURSE-TAKING

Figure 3 summarizes STEM course-taking for Texas high school students from a longitudinal perspective. This means that I follow individual students and track which STEM courses they take in high school by the time they graduate. This approach has the advantage of accurately reflecting students' educational experience. Data presented this way compensate naturally for population growth. This method has the disadvantage that the data lag behind the most recent information available about the schools, because one must follow each student through a minimum of four years to give them the chance to complete high school normally. For example, if in 2016–2017 there was a large rise in juniors taking Computer Science, this approach would miss it. That is why I will also present snapshots of course enrollment by year.



Figure 3: STEM course-taking for freshmen in high school 2008–2014, disaggregated by free/reduced lunch status. Source: Texas Educational Research Center.

The progress of students through high school can be erratic. Each year, approximately 85% of students in the sample who enter as freshmen make it to 12th grade, and 75% go through high school in four years, advancing one grade every year. The figure presented here makes use of all students who were in 9th grade in the specified year. So, if I show that 20% of students eligible for free and reduced-price lunch entering in 2012–2013 took Integrated Physics/Chemistry (IPC), what this means is that we found all students who were in 9th grade in 2012–2013 (this need not be the only year they were in 9th grade) and who were eligible that year for free and reduced-price lunch. Focusing on that cohort, I find that 20% of them took IPC at some point between 2012–2013 when they were in 9th grade and 2015–2016, which is the last year of data available to us.

Courses are arranged in order of descending enrollment. The course with highest enrollment is Biology, which essentially every student takes. Next comes Geometry. One might expect Algebra I to be near the top of the list, but tens of thousands of students take Algebra I in middle school, and the longitudinal studies consider only high school course-taking. Nearly all students take General Chemistry as well. The students who entered high school in 2012–2013 were expecting to have to take it, and would typically have signed up in Spring 2013 to take it as sophomores the following year. By Fall 2013, HB5 had made it optional, but there is no indication that students changed their plans. HB5 technically made Algebra II optional, and the freshmen of 2012–2013 could have taken the other allowed mathematics classes instead, but Algebra II enrollment was unchanged from the previous year, and even increased slightly compared with the year before that.

General Physics does show a drop for the freshmen entering in 2012–2013, but this is almost completely offset by a corresponding rise in AP Physics, and so does not represent a decline in college preparatory physics enrollment. For this reason, I sum together regular and AP class enrollments whenever it makes sense to do so. Pre-Calculus, like Algebra II, held steady for students who were in 9th grade in 2012–2013 compared with the previous year and also showed a slight jump relative to the year before that.

The only course that shows a strong decline in enrollment during the analysis period is IPC. This is a lower-level science course than either Physics or Chemistry. Under HB5, students were allowed to substitute it for Physics and Chemistry, but the effect of the legislative change so far has been to stop it from declining further, not to bring it back.

The remaining STEM courses are all optional and have considerably smaller enrollments. Because HB5 was intended to allow students to pursue career-friendly paths, one might expect Computer Science enrollment to have started growing strongly. Computer Science enrollment has indeed grown, but the growth is slow and student participation remains under 10%. The strongest growth is in Robotics, but the enrollment is still miniscule.

For all the AP courses and for Computer Science, there is a substantial gap between the fraction of students who are eligible for free and reduced-price lunch taking the classes and those not eligible. The gap is largest in AP Computer Science, where it is a factor of 3 and has been growing. Among these optional STEM classes, only Robotics enrolls the same fraction of low-income and well-off students.

Figure 4 shows longitudinal course-taking, but now breaking out racial and ethnic groups. Again, there is no sharp change visible for the students who were in 9th grade in 2012–2013 relative to the previous year. Maybe the most striking feature of the graph is the extent to which Asian students have been pursuing the advanced STEM classes. They are three times as likely to take Computer Science and five times as likely to take AP Computer Science as any other group. The general pattern is that Black and Hispanic students enroll in advanced courses at the lowest rate, with White students at a somewhat higher rate and Asian students at a much higher rate. These group disparities, if anything, grew over the study period.

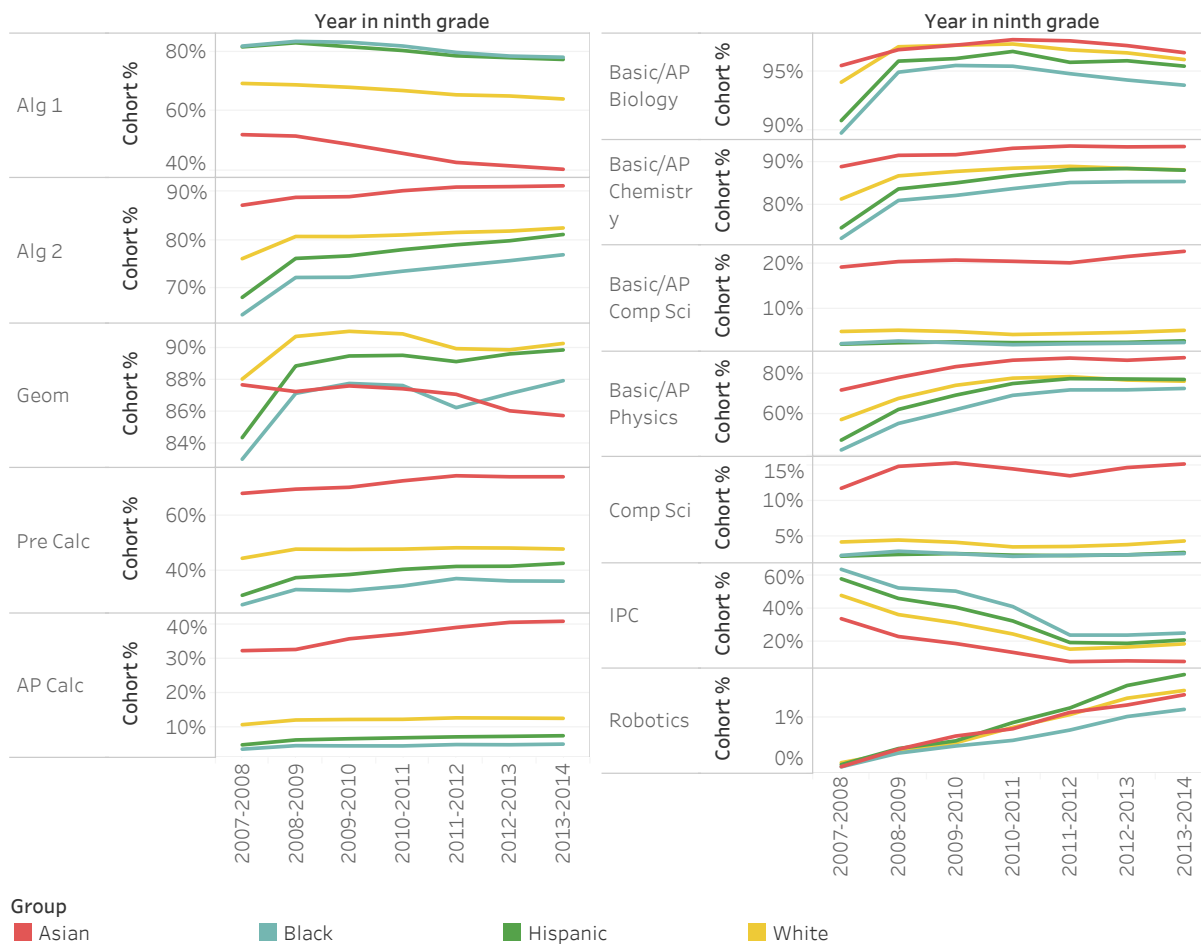


Figure 4: STEM Course-Taking in High School for 2008–2014, disaggregated by racial and ethnic groups. Source: Texas Educational Research Center.

COURSE ENROLLMENT SHAPSHOTS

I now present a second view of course-taking based on course enrollment data. This method has the advantage that one can follow developments closer to the present and obtain a more current estimate of the consequences of HB5. However, one can no longer speak with as much accuracy of the experience of specific students or specific types of students. So as to provide some sense of the impact on different student populations, I divided schools up each year into four groups with roughly equal enrollment, in order of increasing fraction of students eligible for free and reduced-price lunch. These groups describe schools with increasing poverty concentration. So as to account fully for Algebra I, I include both middle and high schools. I construct the quartile boundaries separately each year and separately for middle and high schools.

Figure 5 shows enrollment in selected mathematics courses from 2005 to 2016. The overall message is that for Algebra I, Geometry, and Algebra II, course enrollments have been increasing steadily with the school population. There is no sign of a drop in enrollment in any mathematics courses after HB5. Enrollment varies according to school poverty concentration, but the variation is not as severe as with other courses. Still, in the richest schools, the number of students taking Geometry equals the number taking Algebra I, while in the poorest schools, the number taking Geometry is 20% less than the number taking Algebra I, and the number taking Algebra II is 15% lower still. Figure 6 focuses on districts that enroll high school students in the Distinguished Plan by default. The main observation here is that these districts contain a heavy concentration of schools with low economic need, and it is only in schools with low economic need where one can see an evident effect so far of this policy.

Mathematics by School Poverty Quartile

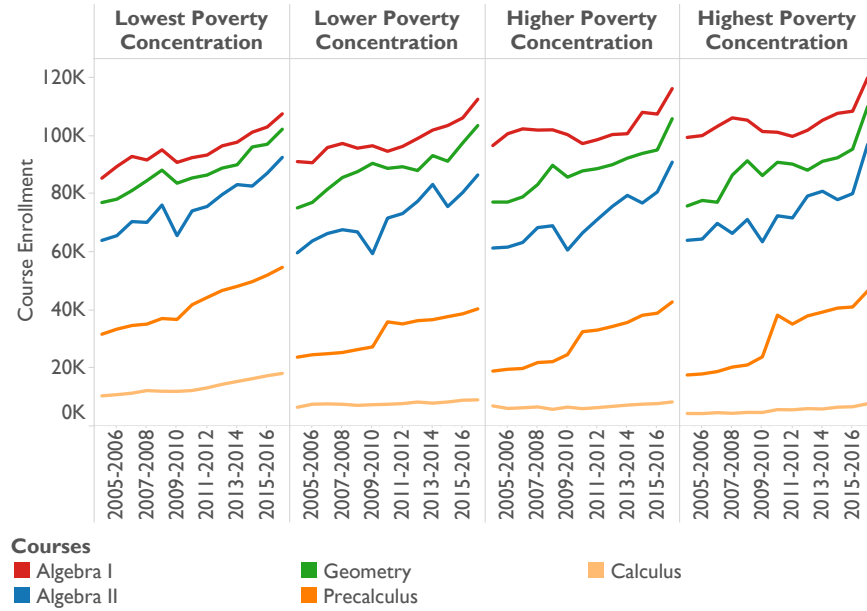


Figure 5: Enrollment in selected mathematics classes, 2005–2016. Data from publicly released files from Texas Education Agency.

Algebra by School Poverty Quartile

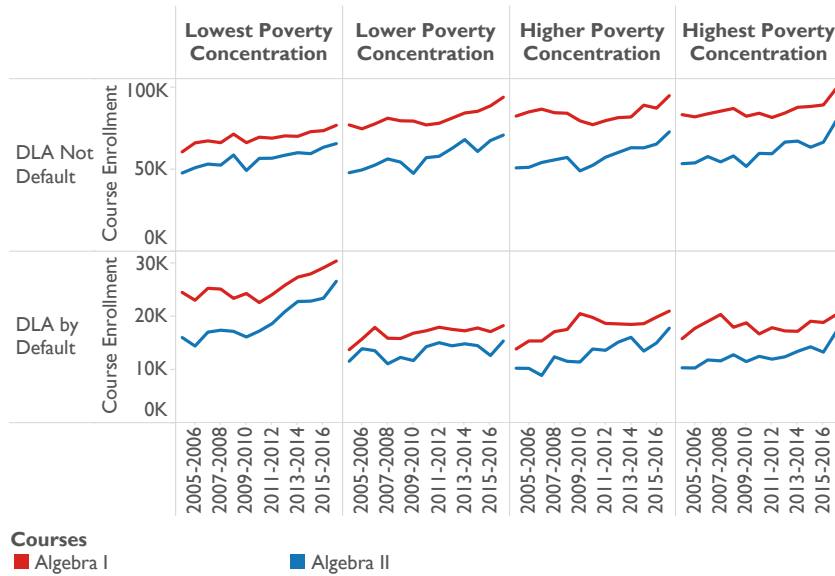


Figure 6: Algebra enrollments in districts that enroll students in the Distinguished Plan by default.

The numbers of students taking Pre-Calculus and Calculus have grown much faster than the student population, although the numbers are still small in comparison with other classes. Students in the richest schools are twice as likely to take Pre-Calculus as in the poorest schools, and three times as likely to take Calculus. There is no sign, however, that HB5 had an effect on any of these trends.

One of the hopes with HB5 was that it would allow students to pursue areas of interest. In Figure 7 and Figure 8, I examine two courses that might be expected to see enrollment gains: Statistics and Computer Science. Statistics has been achieving rapid growth for a decade, mainly in schools with low poverty concentration, and HB5 does not seem to have affected this one way or another. Computer Science does show a particularly large gain in 2014–2015 through 2016–2017 after HB5 passed. This mainly affects schools with the most affluent students.

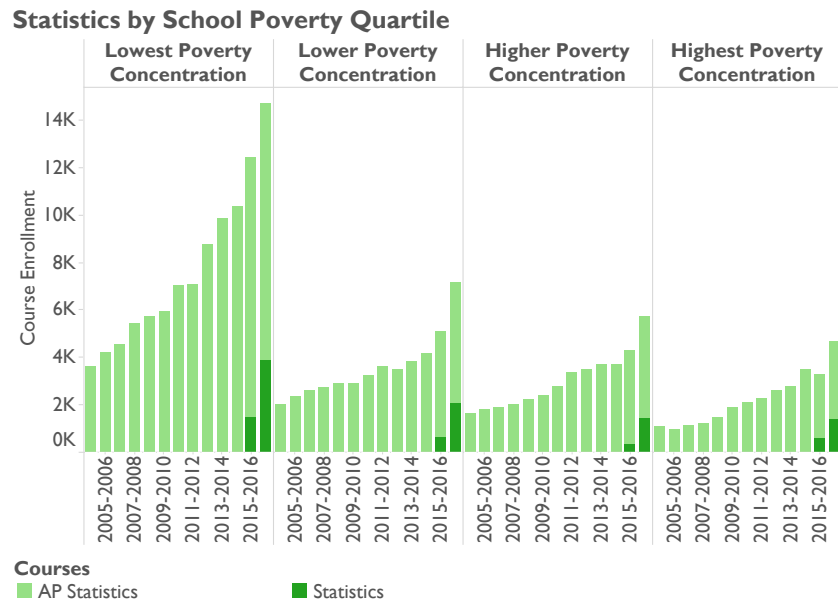


Figure 7: Enrollment in Statistics, 2005–2016. Data from publicly released files from Texas Education Agency.

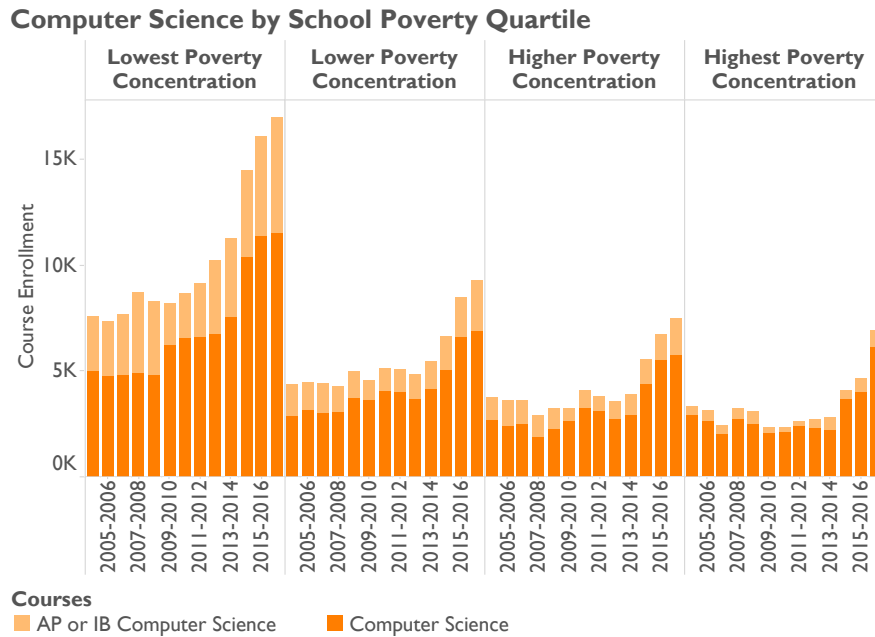


Figure 8: Enrollment in Computer Science, 2005–2016. Data from publicly released files from Texas Education Agency.

Physics by School Poverty Quartile

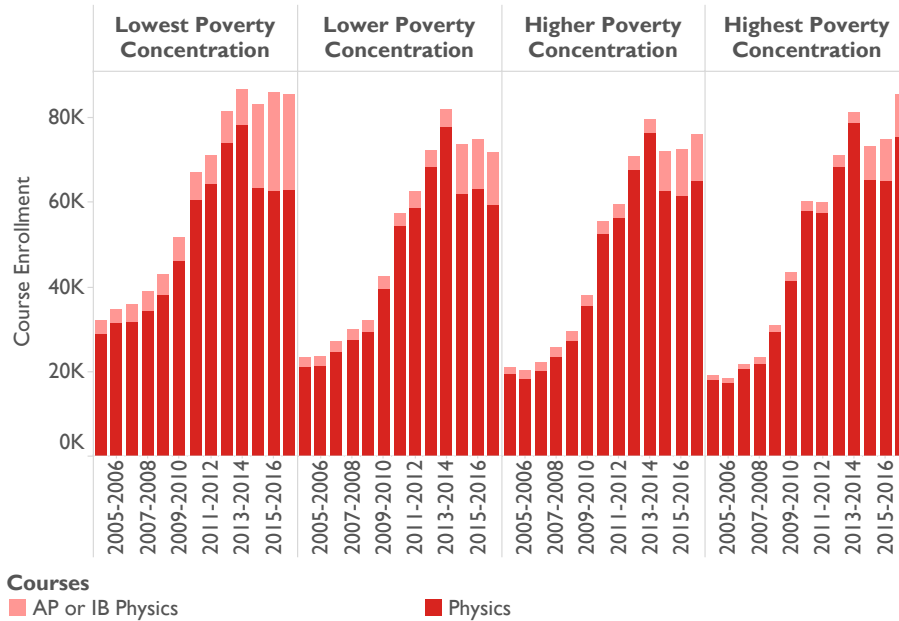


Figure 9: Enrollment in Physics, 2005–2016. Data from publicly released files from Texas Education Agency.

Chemistry by School Poverty Quartile

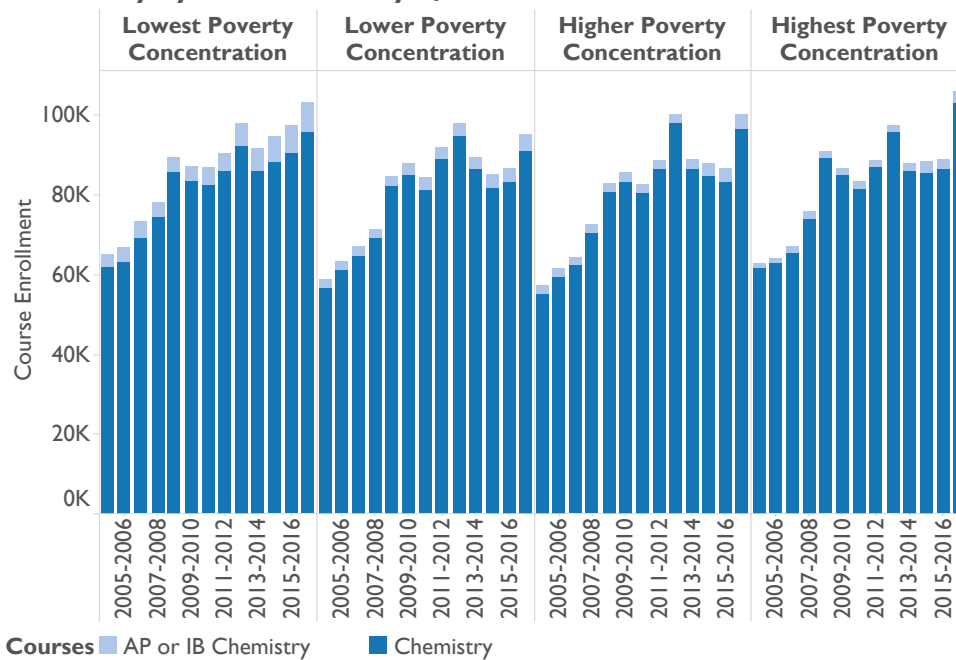


Figure 10: Enrollment in Chemistry, 2005–2016. Data from publicly released files from Texas Education Agency.

Figure 9 shows the history of enrollment in Physics. Nationally, less than 40% of U.S. high school students take Physics, although multiple years of high school Physics are part of the default high school course offerings in Europe and Asia. Texas had arrived at the point where 80% of all students were taking Physics, which made Texas stand out among U.S. states. The passage of HB5 happens to have coincided with the introduction of a new conceptual AP Physics exam that led

to a large increase in AP Physics enrollment. After HB5, Physics enrollment ended its decade of rapid growth, but so far has only declined slightly. Students in the schools with the most concentrated poverty are around 25% less likely to take Physics than students in the most affluent schools.

The story with Chemistry is similar, although the growth since 2005 had not been as dramatic (Figure 10). Texas has been offering Chemistry to essentially every student since the class that entered in 2011. After HB5 passed and Chemistry became optional, there are signs that enrollment is declining slightly except for the richest quarter of schools. Both Chemistry and Physics can be compared with Biology (Figure 11), which remains required; Biology is offered to virtually all high school students, and, like mathematics, has enrollment climbing slowly with population across all school groups.

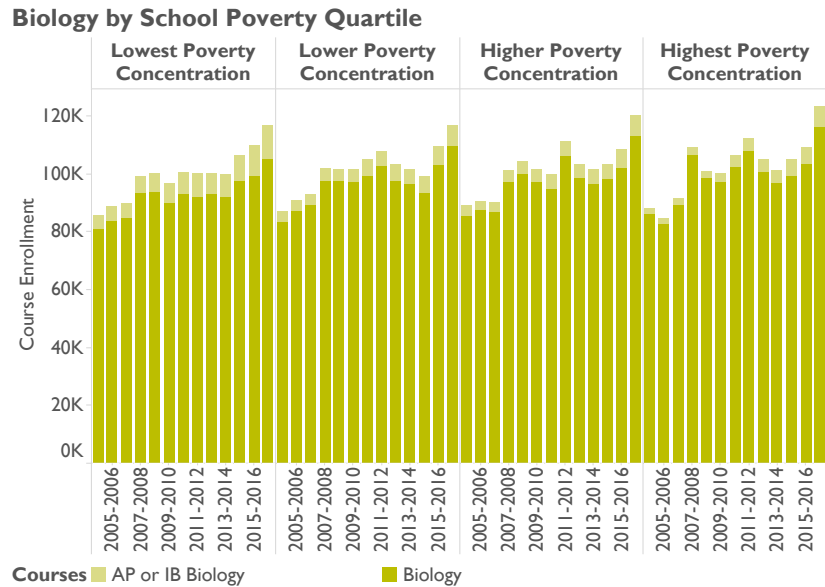


Figure 11: Enrollment in Biology, 2005–2016. Data from publicly released files from Texas Education Agency.

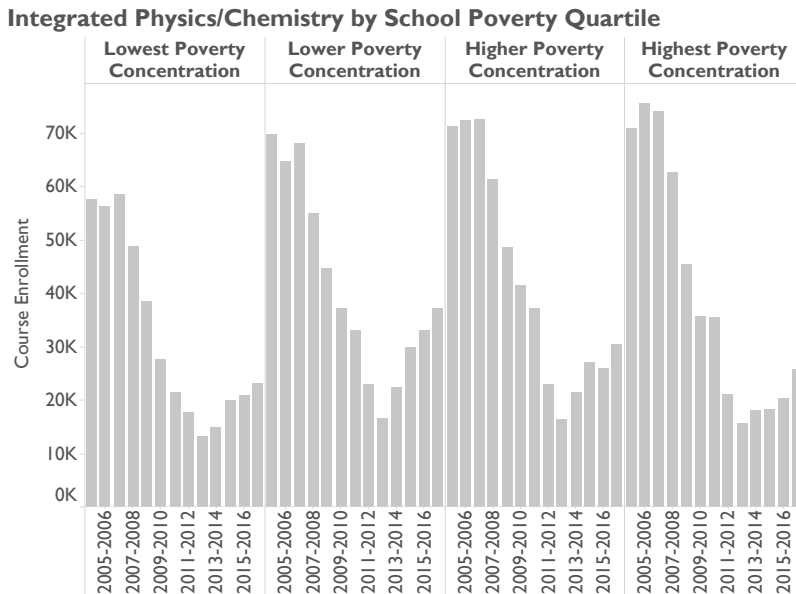


Figure 12: Enrollment in Integrated Physics/Chemistry, 2005–2016. Data from publicly released files from Texas Education Agency.

The final course considered is Integrated Physics/Chemistry, whose enrollment is shown in Figure 12. The steep decline in enrollment of this course, which does not assist with college admission, seems to have halted after HB5, but enrollment remains at a very low level.

CONCLUSIONS

HB5 marked the end of a push at least a decade long to prepare every Texas high school student for post-secondary education. The most serious consequence so far is that the percentage of College Ready high school graduates has plummeted. The most severe drops have taken place for low-income, Hispanic, and Black students, although the drops affect all income, racial, and ethnic groups.

The picture that emerges of course-taking is not as worrisome. Low-income students, and Black and Hispanic students, are less likely to take advanced STEM courses than well-off students, and White and Asian students, but HB5 has not yet affected these gaps. Mathematics course-taking overall hardly seems affected, despite the fact that Algebra II has now technically become optional. If anything, enrollment is increasing across the board. There does seem to be a rise of enrollment in Computer Science and Statistics, almost all in schools serving the least economically needy students. Enrollments in Physics and Chemistry have slightly headed downward, but the effect is not yet large.

The architects of the 60x30 plan for 60% of young Texans to complete post-secondary education by 2030 claimed that achieving this substantial increase in post-secondary attainment was essential for the future of Texas. The 2015–2016 drop in College Readiness Certification will make it harder or impossible to achieve, as will further participation declines in courses such as Physics and Chemistry. The future of young Texans and Texas is at risk, but it is not yet lost.

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