The University of Texas at Austin

Education Research Center POLICY BRIEF

Can Early Exposure to the Teaching Profession Increase Teacher Supply and Diversity? New Evidence on the Teacher Pipeline

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Executive Summary

In response to declining enrollment in teacher preparation programs, localized teacher shortages, the underrepresentation of teachers of color, and increased teacher turnover, states and districts have increased investments in teacher recruitment programs. Many of these programs aim to increase interest in teaching among high school students. The most common feature of adolescent teacher recruitment efforts are education courses that expose high school students to the skills of teaching. This study examined the effectiveness of high school (HS) education courses offered Texas public high schools between 2004-05 and 2014-15 in creating a larger, more diverse, and committed teacher workforce.

Key Findings

- HS education course takers were disproportionately female. White, Black, and Hispanic students enrolled in them at a similar rate.
- Access to HS education courses did not increase entry into the teaching profession.
- Over half of HS education course takers did not enroll in a Texas public four-year college with Black and Hispanic students disproportionately exiting the teacher pipeline prior to college enrollment.
- Teachers who took HS education courses were similarly effective and had higher retention rates when compared to other novice teachers.

These findings suggest that just offering HS education courses is likely not enough to increase teacher supply. However, this does not mean that HS education courses should be discontinued. The students who take them and become teachers have higher retention rates and are similarly effective. Rather, teacher recruitment programs targeted at high school students likely need to be augmented with supports to help interested students continue through the teacher pipeline.

What We Studied

Waning interest in the teaching profession[i], declining enrollments in teacher preparation programs[ii], underrepresentation of teachers of color[iii], and increased teacher turnover[iv] have create challenges in recruiting a diverse and effective teacher workforce. In response, states and districts increased investments in teacher recruitment programs, especially Grow Your Own (GYO) initiatives. GYO programs recruit individuals from the local community, especially high school students and school staff, to become teachers.[v] By recruiting locally, GYO programs can increase local teacher supply because most teachers teach close to home, reducing localized teacher shortages.[vi] Teachers from the same community are more likely to share the racial and cultural backgrounds of their students.[vii] Local teachers also have higher retention rates and are slightly more effective than other teachers.[viii]

The most popular type of GYO initiative aims at increasing the amount of high school students interested in teaching through coursework, hereafter referred to as HS education courses. These courses are predicated on the idea that early exposure will lead to increased entry into the profession and higher levels of commitment to teaching. At least 17 states have statewide GYO teacher initiatives that aim to increase the number of high school students entering teaching, including Texas.[ix] This study examined the role of HS education courses in creating a larger, more diverse, and committed teacher workforce by answering four research questions:

1. Who enrolls in HS education courses?
2. How does access to HS education courses affect teacher supply and diversity?
3. Where do HS education course takers exit the teacher pipeline?
4. Are teachers who take HS education courses more effective and more likely to be retained than non-HS education course taking teachers?

How the Data was Analyzed

This study used detailed statewide data for Texas K-12 students, K-12 teachers, and postsecondary students for the 2004-05 to the 2021-22 school years. These data included K-12 student demographic, course enrollment, achievement (test scores on Texas Assessment of Knowledge and Skills-TAKS from 2004-05 to 2010-11; State of Texas Assessments of Academic Readiness-STAAR from 2011-12 to present), and graduation data; K-12 teacher employment and certification records; and postsecondary enrollment records from public institutions.

The sample consisted of over 2.5 million Texas 9th graders who were first observed in 9th grade between 2004-05 and 2011-12. The sample was restricted to the first eight freshman cohorts of the panel to observe students' workforce outcomes 11 years later. During this time period, HS education courses varied in their names and course codes. It was not until 2011 that the Texas Education Agency instituted specific career and technical education course codes and career clusters as a part of Texas's implementation of the Perkins Act[x]. Given this variation, course subject codes and names were used to identify HS education courses.

First, the authors compared the 8th grade characteristics of students who did and did not take HS education courses. Then, they estimated the effects of offering a HS education course by comparing changes in the probability of becoming a Texas public school teacher within 11 years of starting 9th grade between students who attended schools that started offering HS education courses in the same school year before and after gaining access to a HS education class, relative to students in schools that never had access to HS education courses, using a difference-in-differences design. Next, the authors described teacher pipeline outcomes for the 69,750 9th graders from 2004-05 to 2011-12 who took HS education courses.

Finally, the authors estimated the differential retention and effectiveness of teachers who took HS education courses while they were in high school. They used the sample of 184,673 teachers who first taught from 2012-13 to 2020-21 to examine differences in retention. 2012-13, eight years after the start of the panel, is plausibly the first year individuals who were in 9th grade at the beginning of the panel (2004-05) could be teachers, assuming on-time high school and a four year time to graduation in college. Teacher effectiveness was examined by estimating differential contributions of teachers who took HS education courses to 4th through 8th grade student math and reading STAAR assessment scores during the 2012-13 to 2018-19 years using a set of value-added models. This study focused on pre-pandemic achievement due to the large amount of missing test score data during the COVID-19 pandemic. The samples included all 4th-8th grade students with a valid test score for that subject and prior test scores in both subjects, 10,109,703 and 9,574,276 student-year observations for reading and math respectively.

Key Findings

HS education course takers were disproportionately female. White, Black, and Hispanic students enrolled in them at a similar rate.

Figure 1 compares the characteristics of students who did and did not take HS education courses. Over three quarters of HS education course takers were female. This suggests that gender gaps in interest in teaching start before high school. In contrast, there were few differences in HS education course enrollment by race. Asian students disproportionately did not enroll in these courses, but Black, Hispanic, and White students enrolled in them at similar rates. 2.40%, 2.82%, and 2.91% of all Black, Hispanic, and White students in the sample enrolled in a HS education course respectively.

Figure 1. Student Characteristics by HS Education Course Taking Status

Note. Sample includes 2,540,102 Texas public school 9th graders 2004-05 to 2011-12. 69,750 took a HS education course.

Access to HS education courses did not increase entry into the teaching profession.

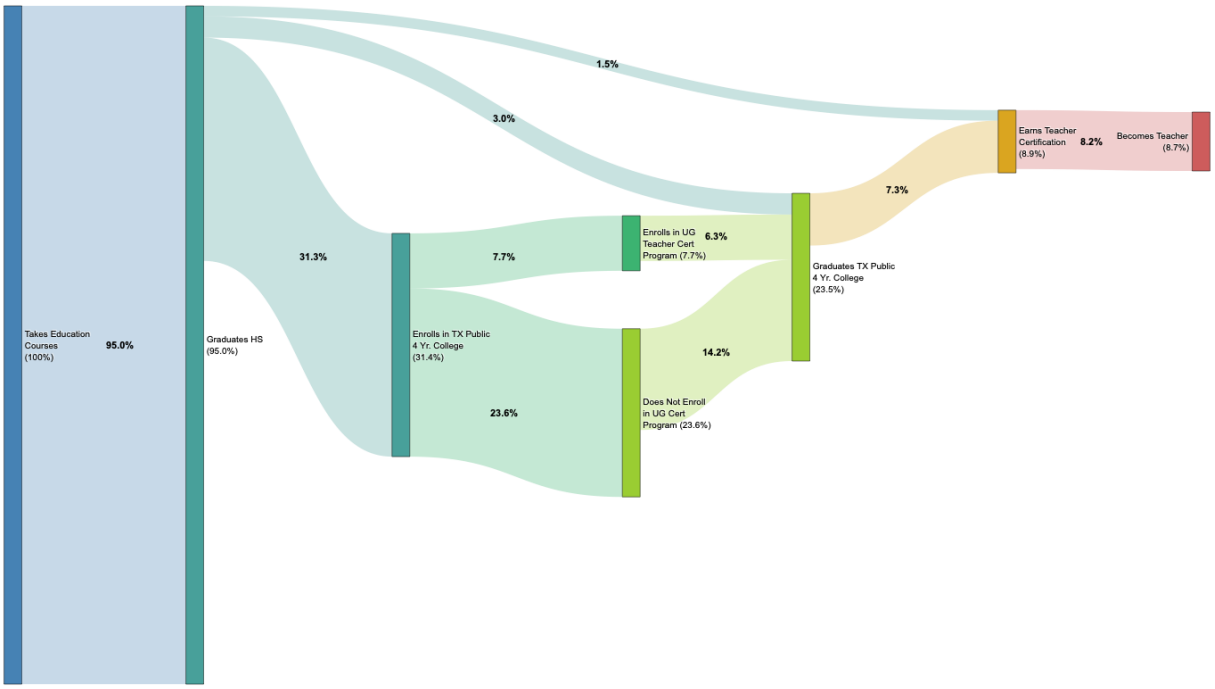
Although students who enroll in HS education courses were four times as likely to become a public school teacher in Texas (8.7% vs 1.9%), as seen in Figure 1, having access to them did not impact their probability of teaching. Figure 2 displays the estimated effect of having access to HS education courses on entry into the teaching profession for the full sample as well as separately for female, male, White, Hispanic, and Black students. All estimates are indistinguishable from zero. This suggests that merely offering HS education courses is unlikely to improve the size or diversity of the teacher pipeline. Rather, pre-existing interest in teaching among HS education course takers may explain their higher levels of entry into the profession.

Figure 2. Effects of Access to HS Education Courses on Probability of Entering Teaching

Note. 1,391,389 first time Texas ninth graders from 2004-05 to 2011-12 who enrolled in a high school that did not offer HS education courses in their first year in the sample are included in sample. Outcome: Becomes a teacher in a Texas public school within 11 years of starting 9th grade. Results estimated using a "stacked" difference-in-differences approach[xi]. 95% confidence intervals created from robust standard errors clustered at the school level.

Over half of HS education course takers did not enroll in a Texas public four-year college.
One reason that HS education courses did not increase entry into the teaching profession is that many course takers are unable to complete the requirements associated with becoming a teacher. HS education course takers' journey through the teacher pipeline is displayed in Figure 3. The analyses reveal that low college enrollment rates may explain the small amount of HS education course takers becoming teachers. Only one-third (31.4%) of HS education course takers enroll in a Texas public four-year college within seven years of starting high school.

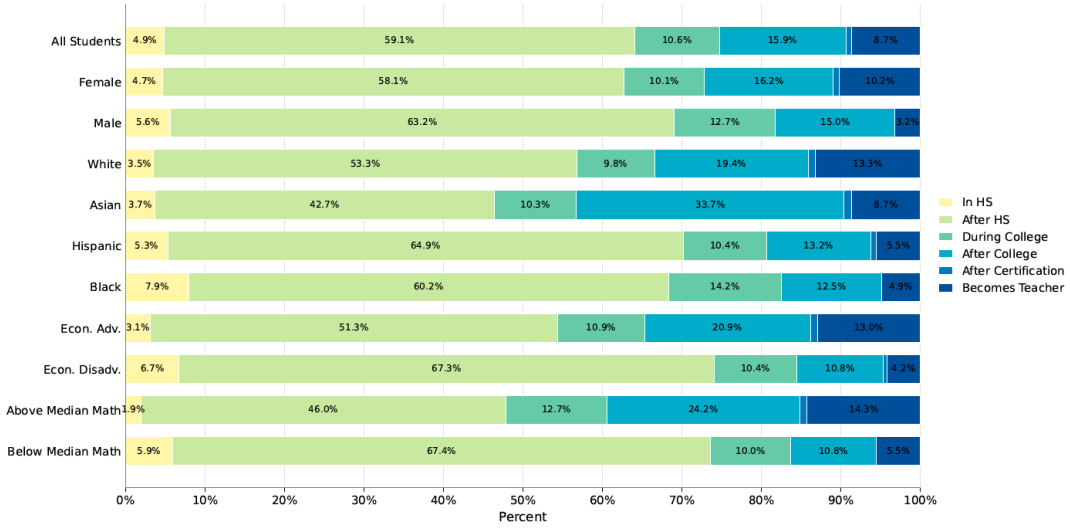
Figure 3. Teacher Pipeline Trajectories of HS Education Course Takers



Note. N=69,750 students. Graduating HS= graduating high school within 5 years of starting 9th grade; Enrolls in TX Public 4. Yr College=enrolling in a Texas public 4-year college within 7 years; Enroll in Teacher Cert Program=enrolling in an undergraduate certification program at a Texas public 4-year college within 7 years; Graduates TX Public 4 Yr. College=graduating from a Texas public 4-year college within 9 years; Earns Teacher Certification=earning a Texas teacher certification within 11 years. Becomes Teacher=teaches in a Texas public school classroom within 11 years. Bolded percentages are the percent of all HS education course takers flowing between the two milestones. 3% of HS education course takers graduate from TX public 4-year college within 9 years of starting 9th grade but do not enroll in one within 7 years, potentially due to transfer from another institution. Another 1.5% of HS education course takers earn teacher certification without being observed in a TX public 4-year. These students likely graduate from private or out-of-state universities. Percentages in parentheses represent the percent of all HS education course takers in the sample that complete the milestone. Flows that are less than 1% of the sample are suppressed.

Black and Hispanic students disproportionately exited the teacher pipeline prior to college enrollment.
Although Black and Hispanic students enroll in HS education courses at similar rates to White students, they enter teaching at a lower rate. Over twice as many White HS education course takers become teachers (13.3%) relative to Black (4.9%) and Hispanic (5.5%) HS education course takers. Nearly 70% of Black and Hispanic HS education course takers leave the teacher pipeline because they do not enroll in a Texas four-year public college compared to less than 60% of White and Asian students. This suggests that racial gaps in the teacher pipeline emerge by the time of college enrollment and continue to grow.

Figure 4. Teacher Pipeline Exit For HS Education Course Takers by Demographic Characteristics



Note. N=69,750 students. Bar values represent the proportion of students who do not complete any further milestones in the data within one year after on-time completion. For example, if we observe a student graduating high school but no other milestones, we consider them to have exited after high school (HS). No more than 1% of any group of students exit the teacher pipeline after certification but before becoming a teacher.

Teachers who took HS education courses were similarly effective to other teachers.

Figure 5 displays the difference in contributions to students' math and reading test scores between teachers who took HS education courses and those who did not. On average, teachers who took HS education courses when they were in high school contribute about 0.004 S.D. and 0.003 S.D. more to students' math and reading achievement than other teachers respectively. These estimates are very small and only the estimate for math achievement is statistically significant. This supports the conclusion that HS education course takers are similarly effective to other teachers.

Figure 5. Average Differences in Contributions to Student Math and Reading Achievement for Teachers who Took HS Education Courses

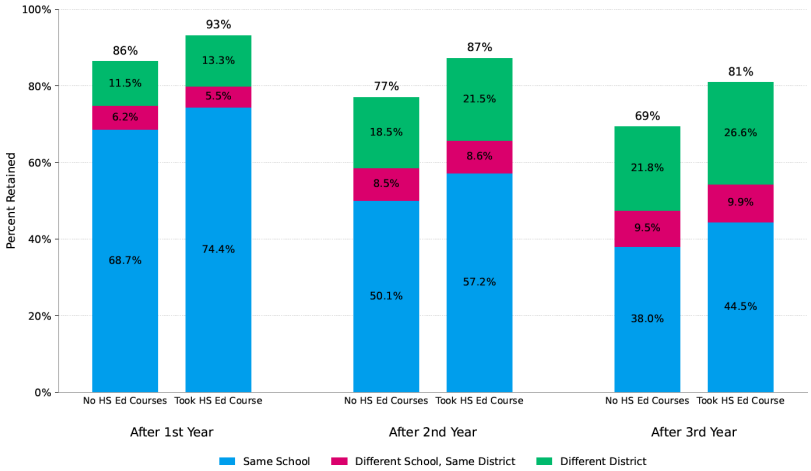
Note. N students: 9,574,276 for math achievement; 10,109,703 for reading achievement. 95% confidence intervals constructed from robust standard errors clustered at the student level. Models included the following: cubic polynomials of previous test score in reading and math; indicators that equal one if the math or reading test score from a year other than the previous year is used; indicators for students' gender and race and their economic, English learner, and disability statuses; average test score and demographic characteristics of student's classroom peers and their class size; average school test scores, average school demographic characteristics, district locale, the logarithm of school enrollment, and grade-year fixed effects.

Teachers who took HS education courses exhibited greater commitment to remain at their school and in the profession.

Retention rates of novice teachers who did and did not take HS education courses while they were in high school over the first three years of their teaching career are compared in Figure 6. HS education course takers have higher retention

rates than other novice teachers. Four out of five (81%) teachers who took these courses were still teaching in Texas public schools three years after they entered the profession compared to 69% of other novice teachers.

Figure 6. Teacher Retention for First Three Years by HS Education Course Taking Status



Note. N=145,092 teachers. Sample includes all first year teachers from 2012-13 to 2018-19. 140,872 teachers did not take HS education courses. 4,220 took HS education courses.

Conclusions

Just offering HS education courses is likely not enough to increase teacher supply or diversity. Only a small proportion of students took them and less than a third of those that did enrolled in a public four-year university in Texas. Although Black and Hispanic adolescents were similarly interested in teaching, as evidenced by enrollment in HS education courses, they disproportionately did not become teachers, likely due to higher barriers to college enrollment.

Just because the HS education courses examined in this study did not directly improve teacher supply or diversity does not mean they should be discontinued. The students who took them and become teachers had higher retention rates and were similarly effective. Rather, teacher recruitment programs targeted at high school students likely need to support them to continue through the teacher pipeline. Grow Your Own programs[xii] and career academies[xiii] that increase college-going and entry into the job field are designed to provide financial support and build partnerships with educational opportunities and potential employers through cohort models and multiple years of programming.

Still, states and districts may want to focus on teacher recruitment programs that can more immediately reduce teacher shortages. Well-designed teacher residencies[xiv] and paraprofessional recruitment programs[xv] have similar, if not larger, effects on teacher effectiveness, retention, and diversity and can fill teaching positions more immediately than investing in programs focusing on high school students who are years away from entering the classroom.

Policy Recommendations

- Provide financial support for bachelor's degree and teacher certification completion to students who take HS education courses.
- Prioritize HS education course takers for instructional positions given their greater likelihood to remain in the profession.
- Implement teacher education career academies with dedicated cohorts and university partnerships.
- Prioritize teacher recruitment programs that provide supports to individuals interested in teaching that can enter the classroom shortly (e.g., existing school employees, teacher candidates).

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DISCLAIMER: The conclusions of this research do not necessarily reflect the opinion or official position of the Texas Education Research Center, the Texas Education Agency, the Texas Higher Education Coordinating Board, the Texas Workforce Commission, or the State of Texas.

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