Equity and Student Growth in Texas

Authored by: Caitlin Hamrock, PhD and Rodrigo Lopez

June, 2020
**Introduction**

In this report, we will explore equity in the achievement of different student groups across Texas, using 3D Growth score data for math and reading STAAR examinees across all of Texas in 2019. We seek to highlight patterns of interest in student growth for various socio-economic student groups known to be linked to student performance. Through these patterns, we will gain an understanding of equity gaps in student academic growth as informed by 3D Growth scores. Specifically, we will explore differences in the growth of students according to race/ethnicity, income, gender, English Learner status, and Special Ed status. We will examine these groups’ median 3D Growth scores both in isolation, as well as how these are affected by student-teacher race/ethnicity linkages. All differences in 3D Growth scores presented here have been tested for statistical significance and, unless otherwise stated, are statistically significant.

The core measurement component of 3D Growth is the Student Growth Percentile (SGP), which measures a student’s growth over time, rather than measuring performance at an instant of time. For a given year, the SGP score is calculated by taking up to three prior years of test scores, and first grouping students into peer performance groups based on the combination of scores for these years. Then within each peer group, a percentile rank is determined for each student based on the current-year score of that student as compared to others in the peer performance group. Because SGP considers performance over time, rather than performance on a single examination, its measure of growth is robust when compared to performance at an instant of time. A key advantage of SGP is that it allows growth to be meaningfully measured beyond simple absolute performance. As a result, students who previously scored low on the STAAR exam, who then make great strides can be identified as students who demonstrate strong growth and may have not yet reached their full potential. Similarly, high performing students may also be identified as not reaching their full potential if they are showing low growth as compared to their peers.

In 3D Growth, the SGP methodology is adapted to Texas student datasets and assessments. This adapted methodology is used to measure growth of students based on scores on their Math and Reading STAAR exams. Students are compared to their peers across the state and, using the modified SGP methodology, are assigned a percentile rank known as the 3D Growth score for each of these subjects. However, simply providing these scores to school districts with no guiding framework would limit the district’s potential to improve student outcomes. To provide this guiding framework, 3D Growth incorporates sophisticated graphics and data analysis tools in district workshops developed by E3 Alliance that are aimed at providing professional development, an understanding of the 3D Growth score data, and ways in which this data can be leveraged to improve student outcomes.

Under the federal Every Student Succeeds Act (ESSA), states are required to identify ways to measure equity in outcomes for different student populations in their state. Using an extensive competitive process, the Texas Education Agency (TEA) requested input on ways to assess equity through growth measures and chose the E3 Alliance 3D Growth as the most robust methodology. This report represents Texas’ first statewide student equity assessment using academic growth data.
We begin by examining median 3D Growth scores by Education Service Center (ESC) Region to understand the performance of the different regions of Texas. Because 3D Growth calculates growth scores for every student in state with available assessment results, the median for the entire student data set is, by definition, 50. We can see that, for both math (Figure 1) and reading (Figure 2), all ESC Regions have medians that center around 50, with deviations of a few points in either direction. For both math and reading, Region 18 (Midland area) has the lowest median 3D Growth scores, with values of 43 and 45, respectively. The highest 3D Growth score of the twenty regions is Region 19 (El Paso) for math and Region 10 (Richardson) for reading, with values of 54 and 53, respectively.

Figure 1: Median 3D Growth Scores by ESC Region for 2019 Math STAAR Examinees
Next, we examine median 3D Growth scores through the lens of district type. We again see that for both math (Figure 3) and reading (Figure 4) the different district types have median 3D Growth scores that center around 50. For math, the highest median 3D Growth score occurs for Major Suburban districts, while for reading the highest score can be found among Charter School Districts, with values of 52 and 54, respectively. Additionally, we find that Independent Town districts have the lowest median 3D Growth for both math and reading, with values of 47 for both subjects. By visual inspection, we can see that there is near-parity across the other district types for both math and reading. While all the differences in both region and district-type are small, they are statistically significant.
Student Demographics

Having broadly examined the overall status of Texas’ regions and district types, we now examine median 3D Growth scores by the socio-demographic characteristics of Texas students. First, we will explore the socio-demographic composition of the Texas student population, and then median 3D Growth scores for Texas students grouped according to these demographics.
Looking at student demographics by income status (Figure 5), we find that there is a 40:60 ratio of non-low income students to low income students across the state.

**Figure 5: Texas Student Demographics by Income Status for 2019 Math and Reading STAAR Examinees**

Next, we examine student gender (Figure 6) where we can see that there is a 51:49 ratio – near parity - between male and female students.

**Figure 6: Texas Student Demographics by Gender for 2019 Math and Reading STAAR Examinees**

Moving on to student demographics by race/ethnicity (Figure 7), we can see that the majority of students identify as Hispanic (53% of students), with the next largest group of students identifies as white (27%). The remaining 19% of students identify as Asian, Black, or a race/ethnicity group we will call ‘Other’ that includes other groups too small in number to
consider independently (including students who identify as American Indian, Native Hawaiian, Pacific Islander, or Two or More Races).

Figure 7: Texas Student Demographics by Race/Ethnicity for 2019 Math and Reading STAAR Examinees

Lastly, we will look at the English Learner (EL) status (Figure 8) and Special Ed status (Figure 9). For both EL and Special Ed status, we can see that test takers in these classifications make up less than 10% of the full set of test takers across the state. We can see that 4% of students are classified as EL, while 9% of students are classified as Special Ed students.

Figure 8: Texas Student Demographics by English Learner Status for 2019 Math and Reading STAAR Examinees
Student 3D Growth Scores

Having presented the socio-demographic composition of the state for context, we will next examine median math and reading 3D Growth scores for each of the demographic groups examined above.

First, we examine differences in the math (Figure 10) and reading (Figure 11) growth scores by income status. For both math and reading, we can see that non-low income students hold a higher median 3D Growth score than their low income peers. For both subjects, the non-low income median 3D Growth score is 53 in both reading and math, whereas the low income median 3D Growth score is 48 in both subjects. Since 3D Growth scores do not take into account a student's income status, and instead group and compare students just with those who had the same prior scores to determine current year growth, this difference indicates that not only are low income students in the state scoring at a much lower level based on raw scores, but they are also growing at a lower rate than their non-low income peers - showing that income equity gaps are actually increasing in the state. It is important to note that this is not a "given." In 3D Growth score analyses of individual schools, E3 Alliance has found many schools where gaps are increasing because non-low income students are growing at a faster rate than low income students, but also many schools where the reverse is true and gaps are rapidly closing because of the high growth of low income students in that school.
Figure 10: Texas Median 3D Growth Scores by Income for 2019 Math STAAR Examinees

Figure 11: Texas Median 3D Growth Scores by Income for 2019 Reading STAAR Examinees

Now looking at comparisons by gender for math (Figure 12) and reading (Figure 13), we can see that females have higher median 3D Growth scores than males for both subjects, with female students for both subjects having a median 3D Growth score of 53. In contrast, male students have scores that differ by one point between math and reading (48 and 47, respectively). Notice that there is a parallel between the income and gender patterns, where non-low income students and females have the same median 3D Growth score across subjects and even the same value of 53 for both groups. In addition, the Other race/ethnicity category (low income or male) has lower median 3D Growth scores that are almost all the same value across the groups (all 48, except for male reading at 47). Here, the parallel continues, with this second category (low income and male) having a 3D Growth score 5-6 points lower than the first category (non-low income and female).
Next, we examine median 3D Growth scores by race/ethnicity. For both math (Figure 14) and reading (Figure 15), we find that Asian students, who make up just 4% of the student population, have by far the highest growth scores: 65 for math, 63 for reading. Other race/ethnicity students and White students both score slightly above the state median, at 51 for math and reading. On the other hand, we find that Black students have the lowest median 3D growth score for both subjects, with a value of 47 for both math and reading. While there is near-parity for all race/ethnicity groups except Asian (i.e. White, Hispanic, Black, and Other race/ethnicity students), with these groups centered around a median 3D Growth score of 50, Asian students have a median 3D Growth score that is about 15 points higher than the other race/ethnicity groups for both math and reading.
Figure 14: Texas Median 3D Growth Scores by Race/Ethnicity for 2019 Math STAAR Examinees

![Overall Median 3D Growth Scores, Math, Texas, 2018-2019](image)

Figure 15: Texas Median 3D Growth Scores by Race/Ethnicity for 2019 Reading STAAR Examinees

![Overall Median 3D Growth Scores, Reading, Texas, 2018-2019](image)

If we look at median 3D Growth scores by EL status, we find an interesting result: for math (Figure 16), EL students have a median 3D Growth score that is 5 points higher than their non-EL peers. This outcome is not reflected in the reading data (Figure 17), where there is near-parity between EL and non-EL students, with EL students having a median 3D Growth score one point lower than their non-EL peers. Across subjects, we can see that non-EL students have the same median 3D Growth score of 50, while EL students have a median 3D Growth score 6 points higher in math than in reading. This is a somewhat surprising and favorable finding: those Texas students who may be expected to struggle by speaking a language other than English at home are growing academic on par with or better than their native English speaking peers. This finding should be interpreted with caution, since EL students do not always take the STAAR test depending on which type of language supports they are receiving, and where they...
are in their language program. The EL students included in this analysis may then not represent the full set of EL students state wide, so additional analysis would be needed to understand the performance of EL students across the state.

Figure 16: Texas Median 3D Growth Scores by EL Status for 2019 Math STAAR Examinees

![Overall Median 3D Growth Scores, Math, Texas, 2018-2019](image)

Figure 17: Texas Median Student 3D Growth Scores by EL Status for 2019 Reading STAAR Exams

![Overall Median 3D Growth Scores, Reading, Texas, 2018-2019](image)

Moving on to median 3D Growth scores by Special Ed status, we find that in both math (Figure 18) and reading (Figure 19) Special Ed students have lower median 3D Growth scores than their Non-Special Ed peers. Across subjects, Non-Special Ed students maintain the same median 3D Growth score of 51, whereas Special Ed students hold a median 3D Growth score that is 3 points higher for math than for reading (44 and 41, respectively). This demonstrates that across our state, not only are we not closing
equity gaps for our Special Ed students, but gaps between non-Special Ed and Special Ed students appear to be increasing.

Figure 18: Texas Median 3D Growth Scores by Special Ed Status for 2019 Math STAAR Examinees

Figure 19: Texas Median 3D Growth Scores by Special Ed Status for 2019 Reading STAAR Examinees

Teacher and Student Race/Ethnicity

There have been numerous studies indicating the relative advantages of diversifying our teaching force so that teachers more closely reflect the student population they are serving. However, our teaching force is far from representative now, specifically with respect to the proportion of students and teachers who identify as Hispanic. In Figure 20, we see that the majority (57%) of teachers assigned to the
students analyzed in this report identify as White, with the next largest group of teachers identifying as Hispanic (29%). When comparing this teacher racial/ethnic composition with that of their students (Figure 21), we find that the two compositions differ substantially. We can see that there is an approximate reversal in the proportion of White and Hispanic individuals when comparing student race/ethnicity with teacher race/ethnicity. For the remaining race/ethnicity categories, the proportions remain approximately comparable (within 2 percentage points) between student and teacher racial/ethnic composition.

Figure 20: Texas Teacher Demographics for Teachers assigned to 2019 Math and Reading STAAR Examinees

![Bar chart showing the demographics of Texas teachers in 2018-2019](image)

Figure 21: Texas Student and Teacher Demographic Comparison for 2019 Math and Reading STAAR Examinees

![Bar chart showing the racial/ethnic composition of Texas students and teachers in 2018-2019](image)
Having examined teacher racial/ethnic composition, we now examine the effect of having a teacher of the same race/ethnicity as the student on the median 3D Growth score for various student demographic comparisons. Here we reiterate the fact that, although the differences that will be presented in this section are small, they have all been confirmed as statistically significant.

Observing this effect first by income, we find that for both math (Figure 22) and reading (Figure 23), there is a small difference between the performance of students with the same race/ethnicity as their teacher and a different race/ethnicity from their teacher. For math, non-low income students have a median 3D Growth score one point lower when they share their teacher’s race/ethnicity than when they do not (53 and 54, respectively). Contrastingly, low income students who share their teacher’s race/ethnicity have a median 3D Growth score one point higher than those who do not (49 and 48, respectively). This trend in math is paralleled in reading: non-low income students have a median 3D Growth score two points lower when they share their teacher’s ethnicity than when they do not (52 and 54, respectively), and low income students have the same score (48) regardless of their teacher’s race/ethnicity.

Figure 22: Texas Median 3D Growth Scores by Income and Student-Teacher Race/Ethnicity Link for 2019 Math STAAR Examinees
Next, examining patterns by gender, we find a trend that is similar to the income pattern discussed above: there is a small difference between the performance of students with the same race/ethnicity as their teacher and a different race/ethnicity from their teacher. For math (Figure 24), both males and females who share their teacher’s race/ethnicity have a median 3D Growth score one point higher than their peers who do not. In addition, for reading (Figure 25) we find total parity between students who do and do not share their teacher’s race/ethnicity, for both males and females.
Now examining patterns by race/ethnicity, we again see that there are small differences between the performance of students who share their teacher’s race/ethnicity and those who do not. For math (Figure 26), the largest difference (3 points) occurs for Asian students. Contrastingly for reading (Figure 27), all race/ethnicity groups except White students have a one-point difference between students who do and do not share their teacher’s race/ethnicity (White students have equal scores). For both subjects, within a given student race/ethnicity, those students sharing their teacher’s race/ethnicity perform equally or better than their peers who do not share their teacher’s race/ethnicity, with one exception: students who identify as one of the races in the ‘Other’ category have a median 3D Growth score in reading that is one point higher when they do not share their teacher’s race/ethnicity than when they do.
Moving from examining patterns by race/ethnicity, we now examine student-teacher race/ethnicity matches among EL students. For math (Figure 28), we observe that EL students have a significantly higher median 3D Growth score when they share their teacher’s ethnicity than when they do not. In contrast, the performance of non-EL students is far less dependent on student-teacher race/ethnicity links: non-EL students sharing their teacher’s race/ethnicity have a median 3D Growth score that is one point higher than their non-EL peers who do not share race/ethnicity. If we now look at patterns in reading by EL status (Figure 29), we find parity between non-EL students who do and do not share their
teacher’s race/ethnicity. For EL students, we find a median 3D Growth score that is one point higher when they share their teacher’s race/ethnicity than when they do not.

**Figure 28:** Texas Median 3D Growth Scores by EL Status and Student-Teacher Race/Ethnicity Link for 2019 Math STAAR Examinees

Lastly, we examine Special Ed status. Looking at math (Figure 30), we find that both Special Ed and non-Special Ed students who share their teacher’s race/ethnicity have slightly higher (1-2 points) median 3D Growth scores than their peers who do not share their teacher’s race/ethnicity. The larger difference of
2 points can be seen for students with a Special Ed designation. In addition, we find parity in median 3D Growth scores for reading (Figure 31).

Figure 30: Texas Median 3D Growth Scores by Special Ed Status and Student-Teacher Race/Ethnicity Link for 2019 Math STAAR Examinees

Thus far we have examined median 3D Growth scores for comparisons based on a single demographic factor. In what follows, we examine median 3D Growth scores intersectionally: meaning that we consider multiple student characteristics simultaneously. In this portion of the analysis we group students according to their gender, income, and race/ethnicity simultaneously. We analyze the
performance of these student groups, and then incorporate information about whether a student shares their teacher’s race/ethnicity.

First, we examine this data for math. Beginning with the data for all students (Figure 32), we can see that the highest median growth score is found among non-low income Asian females (66) and the lowest median 3D Growth score is found among Black low income males (44), indicating a growth gap of 22 points. This exacerbates what we know to be even greater gaps in the raw single year assessment scores of these same students. Looking at students who have the same income and race/ethnicity, we can see that female students hold higher median 3D Growth scores than their male peers; consistent with data shown above in Figure 12. Additionally, Looking at students with the same race/ethnicity and gender, but different income levels, we see that non-low income students outperform their low income peers. These trends are similar within the same student-teacher race/ethnicity (Figure 33) and different student-teacher race/ethnicity (Figure 34) groups. Comparing these two groups, however, reveals some interesting results. We find that non-low income Black males and low income White females have higher median 3D Growth scores when their teacher is a different race/ethnicity than them. Non-low income Black males have a median 3D Growth score three points higher when their teacher is a different/race ethnicity, and similarly, low income White females have a median 3D Growth score one point higher. The largest performance difference between same and different race/ethnicity occurs for Asian students (any gender and income level), with all four groups having a median 3D Growth score four points higher when they share their teacher’s race/ethnicity than when they do not.

Figure 32: Texas Median 3D Growth Scores by Income, Race/Ethnicity, and Gender for 2019 Math STAAR Examinees
Finally, we examine this data for reading. We again begin looking at all students (Figure 35). Similar to math, the highest median 3D Growth score is again found among non-low income Asian females (66) and the lowest median 3D Growth score is found among low income Black males (43), resulting in a
growth gap of 23 points. A similar pattern emerges in math scores, where female students hold higher median 3D Growth scores within a given income and race/ethnicity group than their male counterparts. We also see that non-low income students outperform their low income peers within a given race/ethnicity and gender. As before, these trends also hold for the same student-teacher race/ethnicity (Figure 36) and different student-teacher race/ethnicity subsets (Figure 37). Once more, comparing across groups same/different student-teacher race/ethnicity groups, we find interesting patterns. There are three groups of students for which performance is lower when sharing their teacher’s race/ethnicity than when not: non-low income White males, low income White females, and low income White males. For all three of these groups, students sharing their teacher’s race/ethnicity have a median 3D Growth score one point lower than their peers who do not share this race/ethnicity. Lastly, the largest performance difference between same and different race/ethnicity subsets occurs for low income Asian females, whose median 3D Growth score is three points higher when they share their teacher’s race/ethnicity than when they do not.

Figure 35: Texas Median 3D Growth Scores by Income, Race/Ethnicity, and Gender for 2019 Reading STAAR Examinees
Figure 36: Texas Median 3D Growth Scores Among Students with Same Ethnicity as Their Teacher by Income, Race/Ethnicity, and Gender for 2019 Reading STAAR Examinees

Figure 37: Texas Median 3D Growth Scores Among Students with Different Ethnicity from Their Teacher by Income, Race/Ethnicity, and Gender for 2019 Reading STAAR Examinees
Conclusion

In this report, we have explored differences in test score growth based on a variety of student socio-demographic characteristics including income status, race/ethnicity, gender, English Learner status, and Special Ed status. The use of 3D Growth scores allowed us to measure student growth rather than student performance at a single point in time. Through this analysis, we found several interesting patterns in the 3D Growth data that we will summarize here. We found non-low income students and female students had median 3D Growth scores 5-6 points higher than their low income and male peers for both math and reading. We found near-parity between most race/ethnicity groups except Asian students, whose median 3D Growth scores were far higher (approx. 15 points) than their peers for both subjects, and Black students, whose growth scores were lower at a median score of 47. EL students had a median 3D Growth score five points higher in math, but one point lower in reading than their peers. Lastly, we found that Special Ed students had median 3D Growth scores 7-10 points lower than their peers. Of special concern for our state is that, based on 3D Growth data, equity gaps are widening for our low income, Black, male, and Special Education students.

In addition, we also explored the effect of teacher/race ethnicity on median 3D Growth scores for the aforementioned student groups. We found that, with two exceptions, all groups had slightly higher median 3D Growth scores when the teacher shared the race/ethnicity of the student. However, while statistically significant, this pattern was not as pervasive as we would have thought. The two exceptions were non-low income students for both math and reading, as well as students in the ‘Other’ race/ethnicity category for reading.

Lastly, we examined 3D Growth score data intersectionally, looking at income, race, and ethnicity simultaneously and found results consistent with the individual groupings by these three characteristics. Of note is that, for math, non-low income Black males and low income White females had higher median 3D Growth scores when their teacher was a different race/ethnicity than them. For reading, we found that non-low income White males, as well as low income White females and low income White males had higher median 3D Growth scores when they did not share their teacher’s race/ethnicity.

Given the data we have presented here, further research might explore other teacher characteristics that could play a role in the interesting pattern whereby some race/ethnicity groups appeared to have higher median scores when they shared a race with their teacher, while other groups had lower median scores. This research could explore the distribution of teachers of different races and ethnicities across the state, or across types of campuses, as well as teacher’s degree or years of experience. In addition, one could disaggregate students by other characteristics not presented here. Further research could also explore multi-year effects or qualitative educational differences that lead to the growth gaps presented in this report.