

# **Are Texas Middle School Students Prepared for High School? Examining the Effect of Middle School on High School Outcomes**

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**This study was funded by the Texas Business and Education Coalition. The views and conclusions expressed by the author do not necessarily reflect those of TBEC or any organization employing Dr. Fuller**

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## Executive Summary

In the last five years, the attention of policymakers has increasingly focused on the need to prepare a greater number and percentage of high school students to be ready for college. Indeed, during the most recent legislative session, the Legislature added measures of college readiness to the high school accountability system.

Concomitant during this increasing interest in college-readiness has been a focus on reforming and restructuring high schools. The ultimate goal of this reform effort, led primarily by the Bill and Melinda Gates Foundation, was to improve the graduation rate while also improving student achievement.

While both efforts are commendable, some preliminary analyses during the legislative session suggested that many of the outcomes of Texas high schools—accountability ratings in particular—were driven largely by the academic ability of incoming 8<sup>th</sup> grade students.

Thus, the purpose of this particular paper is to examine the relationship between middle school achievement and high school outcomes. In particular, this study focuses on the relationship between the achievement of 8<sup>th</sup> grade students in Texas public middle schools and a series of high school outcomes.

## Conclusions

This study reaches three major conclusions:

1) The performance of students in 8<sup>th</sup> grade is strongly associated with a number of individual outcomes for students in high school. Some of these outcomes include:

- Passing the 9<sup>th</sup> grade TAKS tests;
- Completing and passing 9<sup>th</sup> grade Algebra I;
- Staying enrolled in Texas public schools;
- Progressing to the 11<sup>th</sup> grade on-time; and,
- Meeting the 11<sup>th</sup> grade TAKS college-readiness standard.

Moreover, the 8<sup>th</sup> grade scores of incoming 9<sup>th</sup> grade students at the school level are associated with the percentage of students meeting a college-readiness standard and the percentage of students enrolling in institutions of higher education in Texas.

2) Texas 8<sup>th</sup> grade students have made tremendous gains in mathematics on the National Assessment of Educational Progress and outperform their peers in comparison states. There have been no gains in reading and Texas students do not have achievement rates that are statistically significantly different than peers in comparison states.

3) The achievement gap between White and non-White students and not economically disadvantaged and economically disadvantaged students has not closed substantially on either the NAEP or the TAKS since 2003.

### **Policy Implications**

Because of the preliminary nature of this study, making concrete policy recommendations that will improve outcomes is difficult. However, some broad recommendations can be made about how the state and school districts can prepare a greater percentage of students to meet rigorous college-readiness and workforce-readiness standards. More details about these recommendations are provided at the end of the report.

#### **State Policy**

The state can play a significant role in this area in a number of different ways.

- 1) Ensure that families have access to adequate medical care and other health and human resources.
- 2) Shift more accountability pressure to the district level and away from the school level.
- 3) TEA should collect, analyze, and disseminate data on the number of students failing consecutive TAKS tests over time.
- 4) Add a true growth measure and reconsider the Texas Projection measure.
- 5) Accurately report the achievement gap.
- 6) Create a more equitable school finance system.
- 7) The state should adopt a more rigorous college readiness standard.
- 8) The state needs to re-assess the entire testing and accountability system.
- 9) The state should create a new testing system that provides less of an incentive to “teach to the test” and will reduce score inflation.
- 10) Better prepare teachers and schools to instruct special education and English Language Learner students.
- 11) Carefully examine how we prepare and assess elementary and middle school mathematics teachers.
- 12) Support more research into these and other important public education issues.

#### **District Policies**

- 1) Clearly, districts need to ensure that a far greater percentage of students are adequately prepared for high school than is currently the case.
- 2) Districts need to create data systems that track student performance longitudinally and identify those students failing TAKS test in consecutive years.
- 3) Districts should provide incentives for experienced and effective teachers to teach 9<sup>th</sup> grade courses.
- 4) Districts should provide effective professional development on how to effectively assess and instruct special education and English Language Learner students to all teachers and administrators.

## Introduction

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Concomitant during this increasing interest in college-readiness has been a focus on reforming and restructuring high schools. The ultimate goal of this reform effort, led primarily by the Bill and Melinda Gates Foundation, was to improve the graduation rate while also improving student achievement.

While both efforts are commendable, some preliminary analyses during the legislative session suggested that many of the outcomes of Texas high schools—accountability ratings in particular—were driven largely by the academic ability of incoming 8<sup>th</sup> grade students.

## Purpose

Thus, the purpose of this particular paper is to examine the relationship between middle school achievement and high school outcomes. In particular, this study focuses on the relationship between the achievement of 8<sup>th</sup> grade students in Texas public middle schools and a series of high school outcomes. These outcomes include:

- Percentage of students college-ready;
- Passing the 9<sup>th</sup> Grade TAKS Tests;
- Completing and Passing 9<sup>th</sup> Grade Algebra I;
- Percentage of Students Retained in 9<sup>th</sup> Grade;
- Student Disappearance and Progression Rates; and
- Percentage of Students Enrolling in Institutions of Higher Education.

In addition, this paper concludes by examining the overall picture of achievement for 8<sup>th</sup> grade students in Texas. This examination includes longitudinal analyses of data from the National Assessment of Educational Progress and the TAKS as well as the achievement gap for both measures.

## Data and Methodology

This preliminary study relies on several sets of data. First, student-level TAKS data was purchased from the Texas Education Agency. The data included student TAKS scores, End-of-Course scores, and both Algebra I and English I 9<sup>th</sup> grade course completion and passing rates. Second, data on school-level achievement, student demographics, and achievement were downloaded from the TEA website. Third, data on the number of students enrolling in Texas institutions of higher education after high school graduation was downloaded from the Texas Higher Education Coordinating Board website. Finally, data on the National Assessment of Educational Progress was downloaded from the National Center for Education Statistics website.

## Section I: High School Outcomes

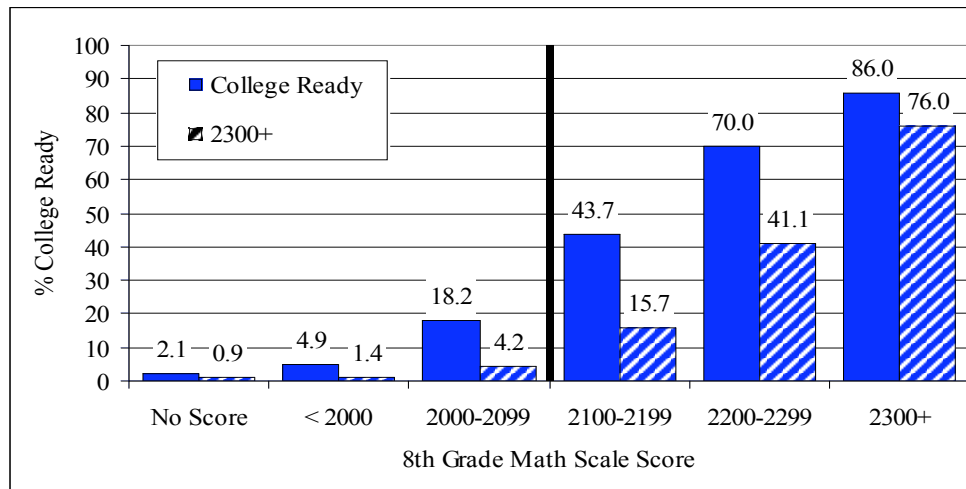
This study focuses on several outcomes at the high school level. While high schools can certainly impact these outcomes, the analyses below show that the 8<sup>th</sup> grade achievement of a student is strongly associated how well the student will perform in subsequent years.

### Percentage of Students College-Ready

The purpose of the college readiness standards in Texas is to create a baseline of knowledge required for students to be successful in college and the workplace. In addition, the standards included a cut score to identify whether students had acquired the necessary knowledge and skills to enter a Texas higher education institution without enrolling in a remedial course. Specifically, the Texas Education Agency (TEA) and Texas Higher Education Coordinating Board (THECB) set this cut score at a scale score of 2200 for both the 11<sup>th</sup> grade TAKS English Language Arts and mathematics tests. However, the National Center for Educational Accountability (NCEA) reviewed data and determined that the 2200 cut score was too set too low to ensure that students were truly ready to successfully complete college English and mathematics courses. Rather than the 2200 cut score, NCEA proposed a 2300 cut score. The authors of the study (Dougherty, Mellor, & Smith, 2006) argued that a score of 2300 was better aligned to other measures of college readiness such as the SAT, ACT, and THEA. The authors found that a score of 2200 predicted that a student would have only a 77% probability of not needing remediation in English while a score of 2300 was associated with a 90% probability of not needing remediation. In mathematics, a score of 2200 was associated with only a 26% probability of being ready for college algebra while a score of 2300 was associated with a 77% probability of being prepared for college algebra. In the analysis below, I employ both standards.

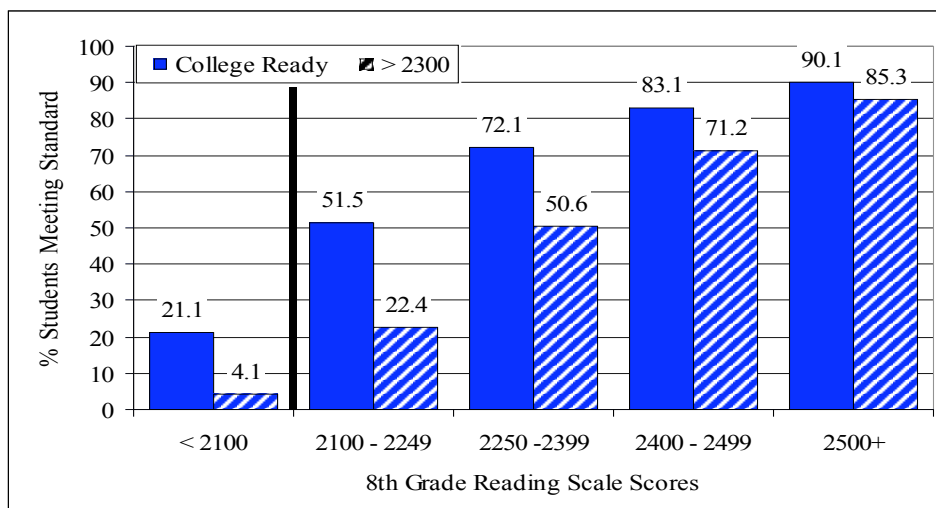
As shown in Figure 1, a student's 8<sup>th</sup> grade TAKS mathematics score was strongly associated with whether the student was considered to be college-ready in mathematics the 11<sup>th</sup> grade in 2009. Strikingly, even for students who passed the 8<sup>th</sup> grade TAKS mathematics test and scored between 2100 and 2199, only 44% met the lower state standard for college readiness and just 16% met the higher NCEA standard. A more detailed analysis not included in this paper revealed that only when students scored at around 2250 or greater was the percentage of students considered college-ready greater than 50% at both standards. To reach a point where 70% of students were considered college-ready in 11<sup>th</sup> grade, students had to score at least 2300 in 8<sup>th</sup> grade. In 2006, only 30% of 8<sup>th</sup> grade students scored at 2300 or above. In 2009, about 29% of 8<sup>th</sup> grade students scored at the 2300 level. Thus, optimistically, only slightly less than one-third of the 8<sup>th</sup> grade students in 2009 were on track to be college ready in 11<sup>th</sup> grade.

Figure 1: Percentage of Students Meeting Mathematics College Readiness Standards by the 8<sup>th</sup> Grade TAKS Mathematics Scale Scores in 2006



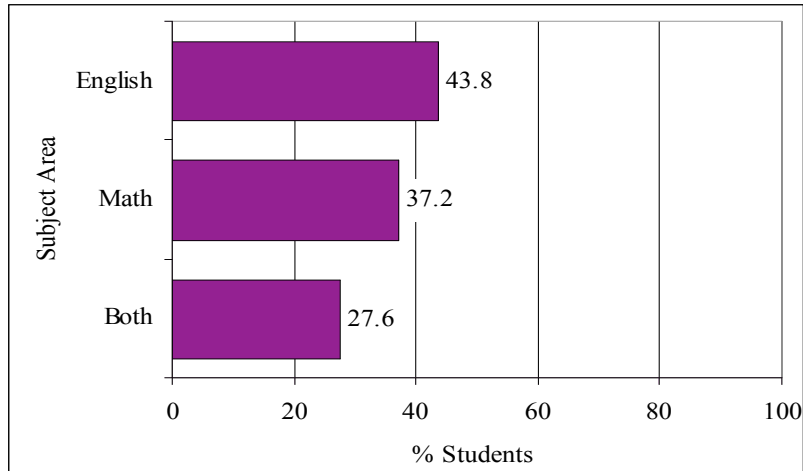
Similarly, as shown in Figure 2, a student’s 8<sup>th</sup> grade TAKS reading score was strongly associated with whether the student was considered to be college-ready in English in the 11<sup>th</sup> grade in 2009. For those students not passing the test, only 21% met the state standard while just 4% met the NCEA standard. As with the mathematics analysis, a more detailed analysis of the reading scores suggests that only when students scored around 2250 in 8<sup>th</sup> grade was the percentage of students meeting both college readiness standards greater than 50%. To reach a point where 70% of students were considered college-ready in 11<sup>th</sup> grade, students had to score at the commended level in 8<sup>th</sup> grade—2400 or above. In 2006, about 28% of students scored at the commended level on the TAKS reading test. In 2009, about 37% of students scored at the commended level, thus more than one-third of students are on track to be college ready in English in the 11<sup>th</sup> grade.

Figure 2: Percentage of Students Meeting English College Readiness Standards by the 8<sup>th</sup> Grade TAKS Reading Scale Scores in 2006



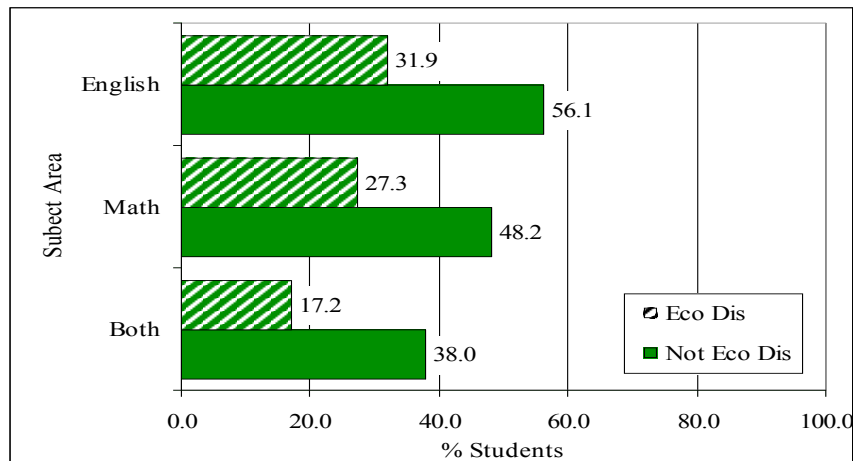
The following analyses employ only the NCEA standard for college readiness since the standard is arguably a more accurate predictor of college readiness than the state standard (See Dougherty, Mellor, & Smith, 2006 for details). As shown in Figure 3, the percentage of 11<sup>th</sup> grade students in 2009 scoring at the NCEA college-ready standard of 2300 was about 44% for English, 37% for mathematics, and only 28% for both English and mathematics. Thus, only about one-quarter of this year’s graduates will have met the college readiness standard in both subjects.

Figure 3: Percentage of 11<sup>th</sup> Grade Students Meeting the NCEA College Readiness Standard Status (2009)



In Figure 4, the percentage of students meeting the NCEA college readiness standard is disaggregated into economically disadvantaged and not economically disadvantaged students. Clearly, there are large gaps in the percentage of students meeting the college readiness standard between the two groups. Indeed, while 38% of not economically disadvantaged students met the college readiness standard in both subjects, only 17% of economically disadvantaged students did so. Given that the proportion of high school students who are economically disadvantaged has increased every year over the last decade, this result does not portend well for the future.

Figure 4: Percentage of 11<sup>th</sup> Grade Students Meeting the NCEA College Readiness Standard by Student Economically Disadvantaged Status (2009)



While Figure 4 provided the overall percentage of students meeting the NCEA college-readiness standard, Table 1 details the percentage of economically disadvantaged and not economically disadvantaged students meeting the standard in schools with different percentages of economically disadvantaged students overall.

Clearly, regardless of the overall percentage of economically disadvantaged students enrolled in the school, a lower percentage of economically disadvantaged students achieve the college readiness standard than their not economically disadvantaged peers. For schools in quartiles I and II, the percentage of not economically disadvantaged meeting the college readiness standard was twice the percentage for economically disadvantaged students. For Quartile III schools, the percentage of not economically disadvantaged meeting the college readiness standard was 10 percentage points greater than the percentage for economically disadvantaged students. Finally, for Quartile IV schools, the gap between the two groups was about five percentage points.

While the gaps do get smaller as the percentage of economically disadvantaged in the school increases, the percentage of students meeting the standards decreases for both groups of students, but in particular for not economically disadvantaged students. Specifically, the percentage of not economically disadvantaged meeting both standards in Quartile I schools was 48%, but only 22% in Quartile IV schools.

Interestingly, the percentage of economically disadvantaged students meeting both standards in Quartile I schools was slightly greater than the percentage of not economically disadvantaged students meeting both standards in Quartile IV schools.

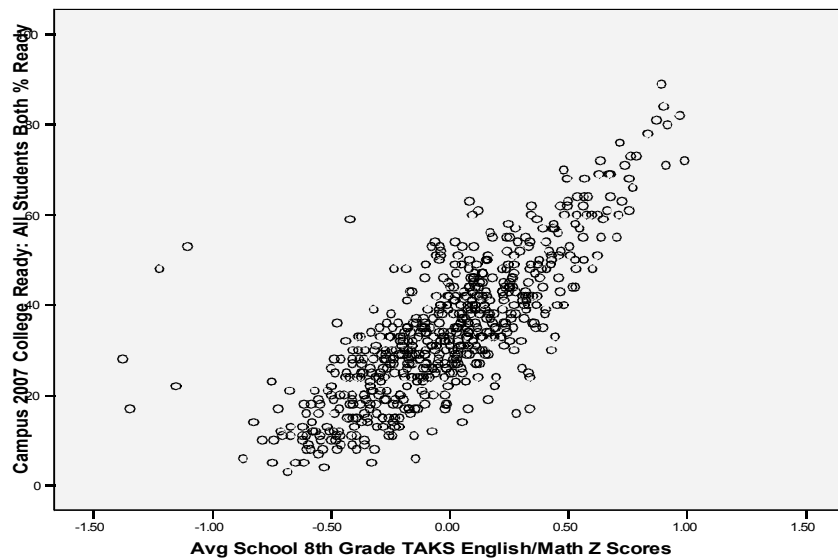
The data, then, suggest that both being an economically disadvantaged student as well as well as being enrolled in school with greater percentages of economically disadvantaged students affects the probability of a student meeting the standards. Yet, as shown previously, the factor with the greatest impact on a student being college ready in 11<sup>th</sup> grade is the student's 8<sup>th</sup> grade TAKS mathematics and English scores.

Table 1: Percentage of 11<sup>th</sup> Grade Students Meeting College Readiness Standards in English and Mathematics by the Percentage of Economically Disadvantaged Students in a School and the Student's Economically Disadvantaged Status

% Eco Dis Students	Eco Dis Student	Subject Area		Both Subjects
		Mathematics	English	
Quartile I: 00.0-25.0%	No	58.1	65.1	47.8
	Yes	34.0	40.0	23.3
	Total	55.0	61.8	44.6
Quartile II: 25.1-50.0%	No	44.7	53.0	34.5
	Yes	28.0	33.8	18.2
	Total	39.0	46.4	28.9
Quartile III: 50.1-75.0%	No	35.4	44.3	25.9
	Yes	25.6	30.0	15.7
	Total	29.5	35.7	19.8
Quartile IV: 75.1.-100%	No	31.2	41.3	21.8
	Yes	26.7	29.6	15.9
	Total	27.3	31.3	16.7
All Schools	No	48.2	56.1	38.0
	Yes	27.3	31.9	17.2
	Total	39.5	46.1	29.4

As shown in Figure 5, the school level results are even more dramatic. Clearly, there is an extremely strong relationship between the 8<sup>th</sup> grade TAKS performance of incoming 9<sup>th</sup> grade students and the percentage of students meeting the TEA's senior high school readiness standard. This standard considers TAKS scores as well as SAT performance of students. There is extremely little variation in these results, suggesting that high schools are simply unable to change the improvement trajectory of students once they reach high school. Perhaps these results will change after we have data on cohorts of students that attended restructured high schools. But the evidence suggests that a better return on investment is available at the elementary and middle school levels than at the high school level.

Figure 5: Percentage of Students Meeting College-Readiness Standard in 2007 and Average School 8<sup>th</sup> Grade TAKS Reading and Mathematics Scores for Incoming 9<sup>th</sup> Grade Students in 2009



All of these above results would be even more troublesome if the analyses would have been adjusted to reflect the number of students disappearing from the system and the number of students not taking particular tests. Thus, the effects of middle school achievement on college readiness would be even more pronounced if all students remained in the system rather than having many of the lower performing students simply disappearing or not taking the TAKS tests.

## Passing 9<sup>th</sup> Grade TAKS

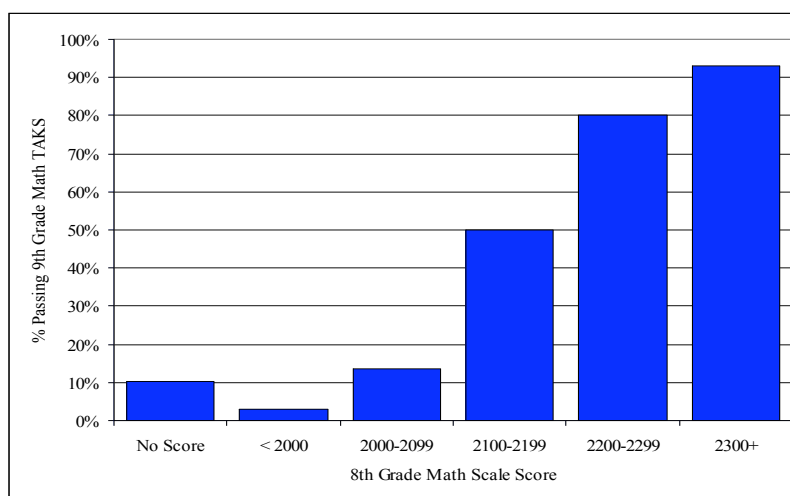
This section reviews the relationship between 8<sup>th</sup> grade TAKS scores and 9<sup>th</sup> grade TAKS outcomes. The data used in these analyses were individual student records in all grades tested from 2003 to 2009.

As shown in Figure 6, there was an extremely strong association between students' 8<sup>th</sup> grade TAKS mathematics scale scores and passing the 9<sup>th</sup> grade TAKS mathematics test. This is not surprising given that once a student achieves the level of knowledge and skills to pass the TAKS test at any grade level, the student is very likely to maintain that level over time.

Given that overall trend, there are some surprising and disturbing trends in the data. First, only 50% of the students who scored just above passing on the 8<sup>th</sup> grade test (scale score of 2100 to 2199) actually passed the 9<sup>th</sup> grade test. Second, only about 12% of students scoring just below passing in 8<sup>th</sup> grade (scale score range of 2000 to 2099) actually passed in the 9<sup>th</sup> grade.

There are a number of possible explanations for this. One explanation is that the 9<sup>th</sup> grade test is simply more difficult than the 8<sup>th</sup> grade test. Conversations with educators suggest this explanation may have some validity. Second, when a student takes a test, that score is not an exact assessment of the student's ability to answer the set of questions correctly. Rather, a test score is an estimate of the student's ability and with that estimate comes a margin of error. For students scoring just above or below a cut score, an additional test may change their score in a way that moves them above or below the test score. This measurement error could account for the lower passing rate in 9<sup>th</sup> grade. In fact, of students scoring close to 2100 in 8<sup>th</sup> grade, about 50% passed and 50% did not pass in 9<sup>th</sup> grade. However, given the scale score ranges employed, a greater percentage of students should have passed if only measurement error was influencing scores. A third explanation could be that the 9<sup>th</sup> grade test is not very well aligned with the 9<sup>th</sup> grade curriculum. Finally, the results could simply indicate that students are not making particularly good progress in the 9<sup>th</sup> grade. Indeed, since 9<sup>th</sup> grade teachers tend to be the least experienced and least qualified teachers on a high school campus, students simply might not make as much progress in 9<sup>th</sup> grade as they need to.

Figure 6: Percentage of Students Passing the 2009 TAKS 9<sup>th</sup> Grade Mathematics Test by the 2008 8<sup>th</sup> Grade TAKS Scale Score



In all likelihood, the results shown in Figure 6 are probably explained by some combination of the above four possible reasons as well as other reasons not listed here. However, regardless of the reasons for the results, the results are extremely clear—students must score substantially above 2100 on the 8<sup>th</sup> grade mathematics test to have more than a 50% probability of passing the 9<sup>th</sup> grade mathematics test.

Figure 7 provides an analysis of those students not passing the 8<sup>th</sup> grade TAKS mathematics test in 2008. The students were provided three opportunities to pass the tests and this analysis incorporates data from all three test administrations. By statute, schools must convene a placement committee for each student in order to determine if the student should be retained in the 8<sup>th</sup> grade or promoted to the 9<sup>th</sup> grade.

As shown in Figure 7, the vast majority of students who failed the TAKS test in 8<sup>th</sup> grade in 2008 were promoted to 9<sup>th</sup> grade in 2009. Specifically, 83% of the students advanced to the 9<sup>th</sup> grade while just fewer than 7% were retained in the 8<sup>th</sup> grade. The remaining 10% were no longer enrolled in a Texas public school in 2009.

Of those students retained in the 8<sup>th</sup> grade 51% did not pass again, 43% passed, and 5% did not have a score reported. The students advanced to the 9<sup>th</sup> grade fared much worse. Specifically, 63% did not pass, 11% passed, and 26% did not have a score reported. Regardless of whether the students were retained or not, students who did not pass the 8<sup>th</sup> grade mathematics test did not fare well in the subsequent year. Those advanced to 9<sup>th</sup> grade, however, fared far worse than those retained. Unfortunately, we don't have enough data to examine the long-term outcomes of the retention or advancement of these students. For example, we would want to examine whether students retained in grade were more likely to drop out than those students who advanced to the 9<sup>th</sup> grade. We would also want to see the percentage of students from each group who passed the 11<sup>th</sup> grade test, who graduated from high school, and who enrolled in higher education.

Figure 7: 2009 Enrollment Outcomes for Students Not Passing the 8<sup>th</sup> Grade TAKS Math Test in 2008 and TAKS Outcomes in 2009

8 <sup>th</sup> Grade	Not Enrolled	9 <sup>th</sup> Grade	
6.6%	10.4%	83.0%	

8 <sup>th</sup> Grade TAKS Math		9 <sup>th</sup> Grade TAKS Math	
Did Not Pass	51.4%	Did Not Pass	63.4%
Passed	43.5%	Passed	10.6%
No Score	5.1%	No Score	26.0%

Figures 8 and 9 present the overall passing rates of 9<sup>th</sup> grade students from 2003 to 2009 by the race/ethnicity of the student. Clearly, the percentages have increased for all groups in both reading and mathematics over time. In reading, the vast majority of students passed the 9<sup>th</sup> grade test in 2009. In mathematics, 70% of White students, 60% of Hispanic students and only 40% of African American students passed the 9<sup>th</sup> grade mathematics test in 2008.

Figure 8: Percentage of Students Passing the TAKS  
 9<sup>th</sup> Grade Reading Test by Student Subpopulation (2003-2009)

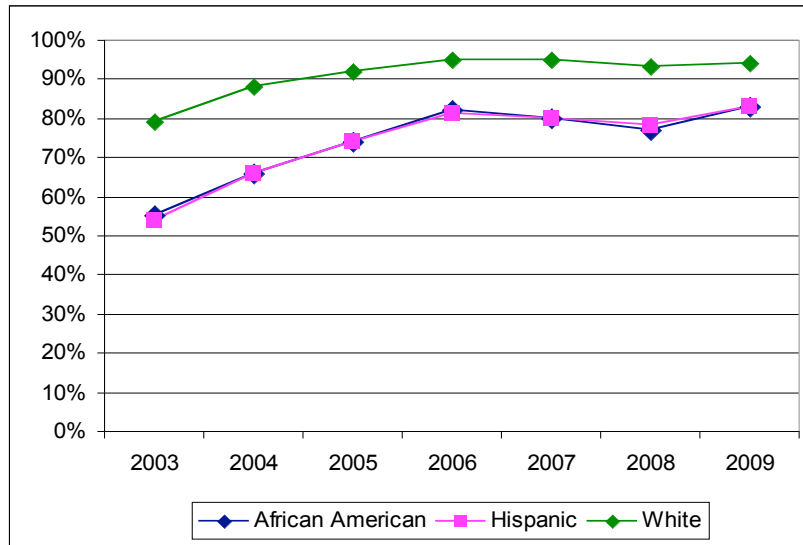
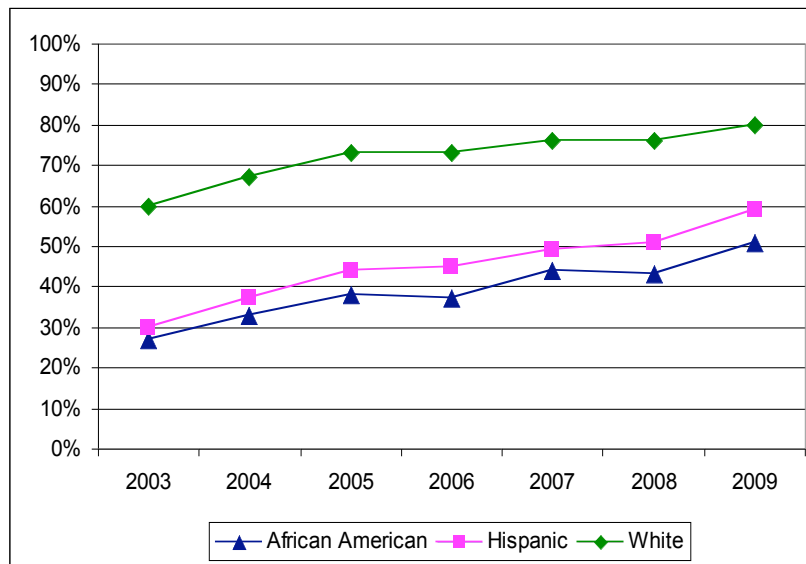


Figure 9: Percentage of Students Passing the TAKS  
 9<sup>th</sup> Grade Mathematics Test by Student Subpopulation (2003-2009)



## Completing and Passing 9<sup>th</sup> Grade Algebra I

This section of the study examines the relationship between 8<sup>th</sup> grade TAKS achievement and 9<sup>th</sup> grade course completion and course passing rates in 9<sup>th</sup> grade Algebra I. The data underlying these analyses are individual student 8<sup>th</sup> grade TAKS data from 2007 and individual student level course completion and course passing data from 9<sup>th</sup> grade Algebra I. The two data sets—both from TEA—were merged at the individual student level.

As shown in Figure 10, there was a strong relationship between student 8<sup>th</sup> grade TAKS mathematics scale scores and passing 9<sup>th</sup> grade Algebra. Less than 50% of students who scored less than 2000 on the 8<sup>th</sup> grade TAKS passed 9<sup>th</sup> grade Algebra I while only 65% of those who scored between 2000 and 2100 passed 9<sup>th</sup> grade Algebra. Thus, the probability of passing 9<sup>th</sup> grade Algebra I was severely diminished for students not passing the 8<sup>th</sup> grade TAKS mathematics test.

On the other end of the continuum, students who scored above 2200 were likely to pass Algebra I in 9<sup>th</sup> grade. Indeed, over 90% of students scoring 2200 or above successfully completed and passed 9<sup>th</sup> grade Algebra I.

Figure 10: Percentage of Students Passing 9<sup>th</sup> Grade Algebra I in 2008 by 8<sup>th</sup> Grade TAKS Mathematics Scale Scores in 2007

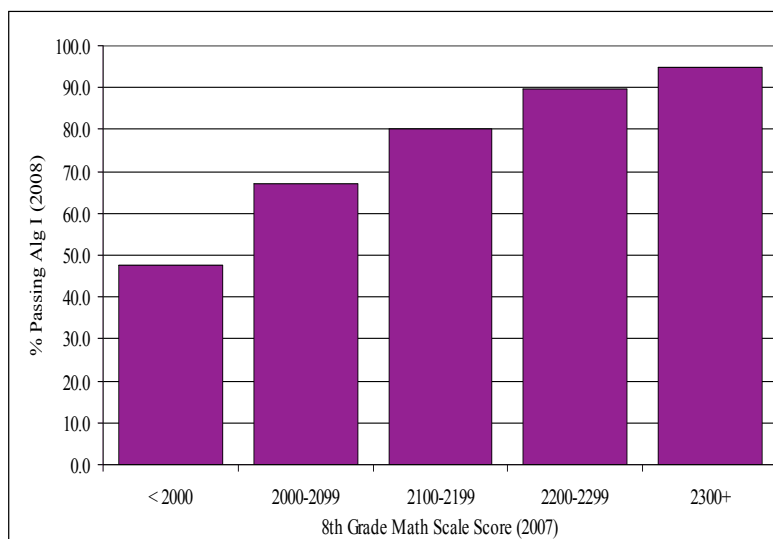


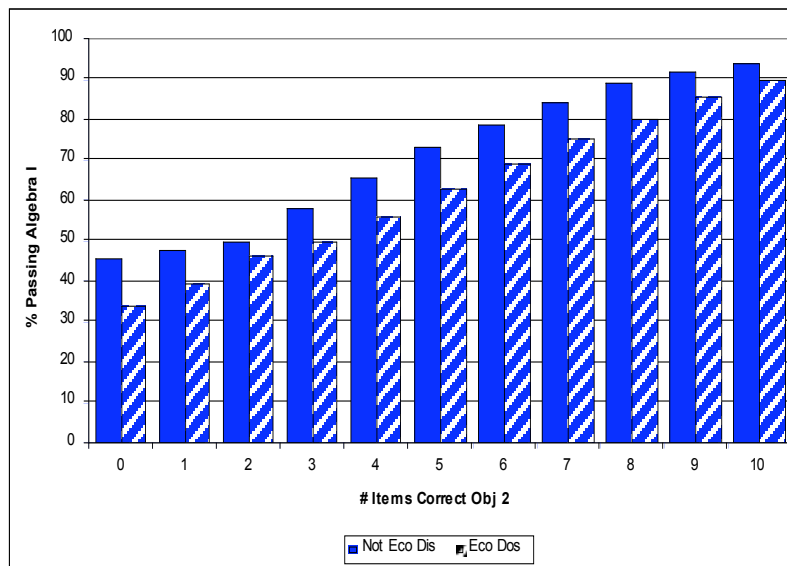
Figure 11 displays the relationship between the number of items correct on Objective Two of the 8<sup>th</sup> grade TAKS mathematics test and the percentage of students passing 9<sup>th</sup> grade Algebra I. This objective has 10 questions that cover patterns, relationships, and algebraic reasoning. Of the available objectives, this objective is generally considered to be the best predictor of success in Algebra I.

Not surprisingly, the greater the number of items answered correctly, the greater the percentage of students passing Algebra I in 9<sup>th</sup> grade. Moreover, this was true for both not economically disadvantaged and economically disadvantaged students. Despite the positive relationship between the number of items answered correctly and passing Algebra I, roughly 50% of the students who answered one to three questions correctly actually passed Algebra I.

Further, answering five or more questions correctly was associated with 70% of students or greater passing Algebra I.

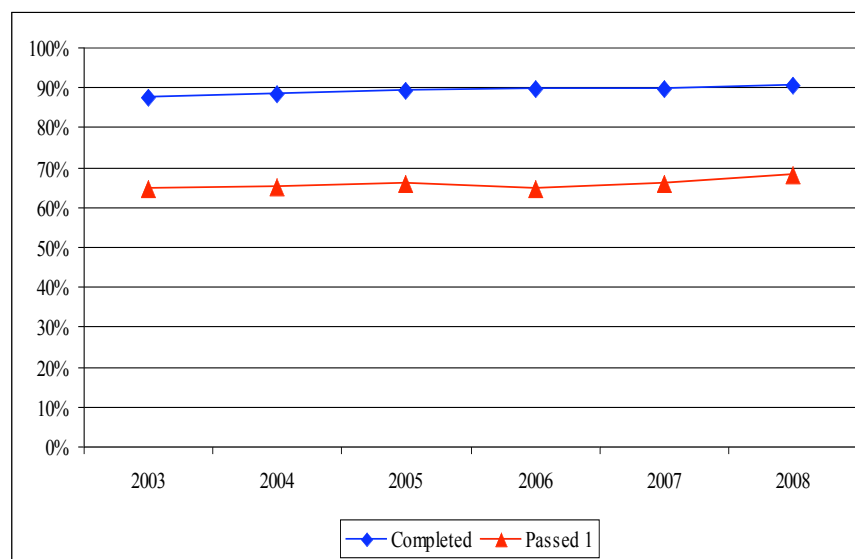
Thus, this objective does not appear to be a particularly strong predictor of success in Algebra I. This may be the small number of questions in the objective overall and the very small number that directly assess algebraic thinking.

Figure 11: Percentage of Students Passing 9<sup>th</sup> Grade Algebra I by the Number of Items Correct on Objective 2 of the 8<sup>th</sup> Grade TAKS Mathematics Test



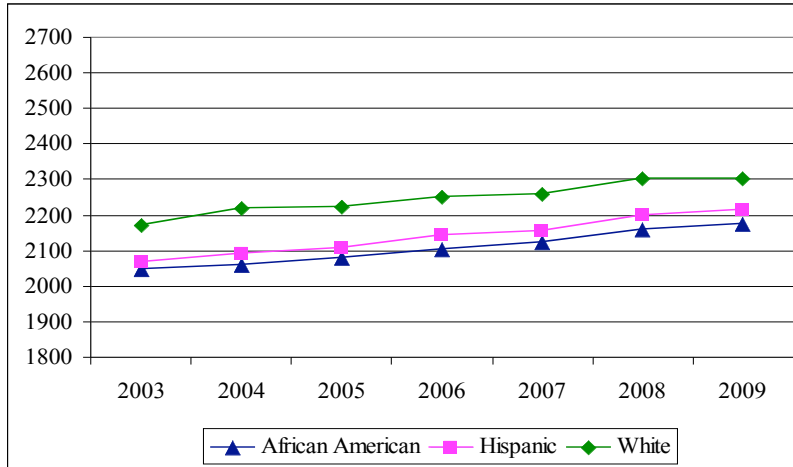
Interestingly, as shown in Figure 12, the percentage of students completing and passing 9<sup>th</sup> grade Algebra I has remained fairly steady from 2003 to 2008. There have been some marginal increases, especially in the past year or two.

Figure 13: Percentage of Students Passing 9<sup>th</sup> Grade Algebra I (2003 to 2008)



One possible explanation for the lack of improvement in passing Algebra I is that a greater and greater percentage of students are taking Algebra I in middle school, thus leaving only students from the lower end of the distribution of scale scores taking 9<sup>th</sup> grade Algebra I. In contrast, as shown in Figure 13, the average scale score of students has increased over the past seven years for all student groups. One would expect that the percentage passing 9<sup>th</sup> grade Algebra I would have increased over time as the average scale increased over time.

Figure 13: Average Scale Scores of Texas Students on the TAKS 8<sup>th</sup> Grade Mathematics Test by Student Subpopulation (2003-2009)

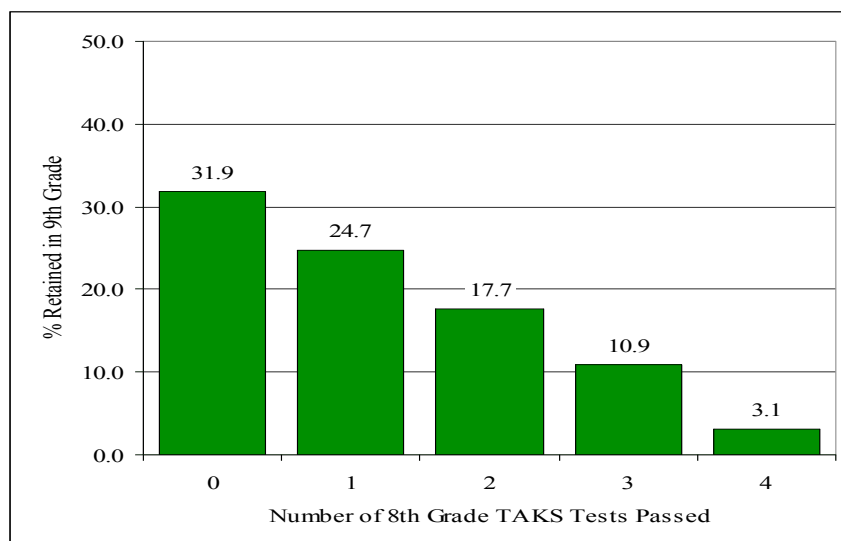


### Percentage Retained in 9<sup>th</sup> Grade

This section more closely examines the percentage of students retained in 9<sup>th</sup> grade. Again, the analysis is based on student-level data merged over time.

As shown in Figure 14, the greater the number of TAKS tests passed in 8<sup>th</sup> grade, the lower the percentage of students who were retained in the 9<sup>th</sup> grade. Indeed, while over 30% of students who did not pass any tests in 8<sup>th</sup> grade eventually were retained in the 9<sup>th</sup> grade, only 3% of students who passed all four tests were retained.

Figure 14: Percentage of Students Retained in 9<sup>th</sup> Grade  
by the Number of 8<sup>th</sup> Grade TAKS Tests Passed

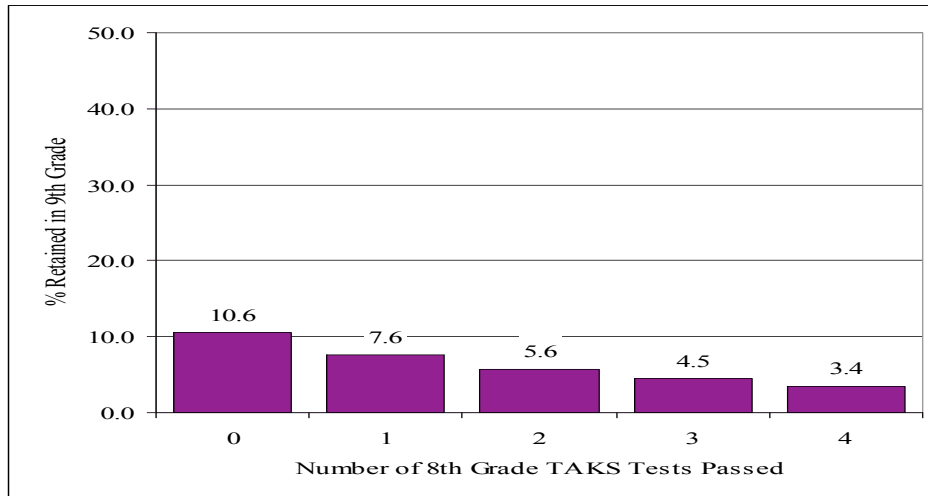


### Student Disappearance and Progression Rates

This section examines the relationship between 8<sup>th</sup> grade TAKS scores and student disappearance rates. A student is considered to have disappeared if the student had an answer document submitted for a TAKS test in one year, then did not have an answer document submitted by any Texas public school for a TAKS test in the subsequent year. Importantly, all students enrolled in a Texas public school should have an answer document submitted regardless of whether the student actually takes the test or not.

As shown in Figure 15, the percentage of students no longer enrolled in a Texas public schools one year after 8<sup>th</sup> grade varied inversely with the number of 8<sup>th</sup> grade TAKS tests passed. Specifically, 11% of students who had not passed any tests disappeared while just over 3% of students who passed all four tests disappeared. While certainly not all of these students actually dropped out of school, it would be fair to assume that some substantial proportion of these students no longer enrolled in school did actually choose to drop out of school.

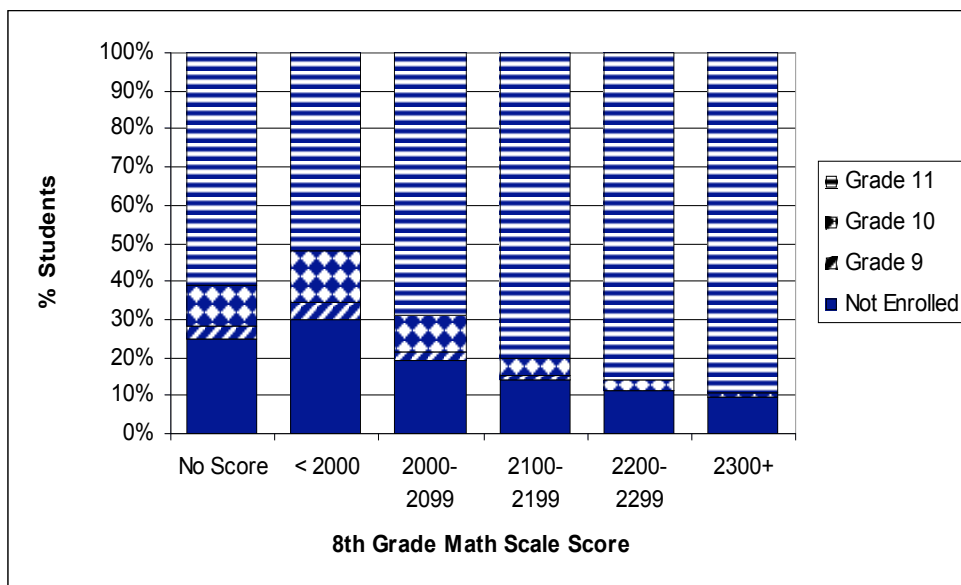
Figure 15: Percentage of Students No Longer Enrolled in Texas Public Schools by the Number of 8<sup>th</sup> Grade TAKS Tests Passed



As shown in Figure 16, the greater the 8<sup>th</sup> grade TAKS mathematics scale score, the lower the percentage of students who were no longer enrolled in a Texas public school. Thus, there appears to be a negative relationship between scale scores and remaining in the Texas public school system and a positive relationship between scale scores and continuing on track for a normal grade progression.

Both of these outcomes certainly make sense. Undoubtedly, students scoring at the bottom of the distribution of TAKS are more likely to drop out of school than other students. On the other hand, students scoring at the top end of the distribution are likely to progress from one grade to another on schedule since there are highly unlikely to be retained in grade.

Figure 16: Enrollment Outcomes in 2009 by the 8<sup>th</sup> Grade TAKS Mathematics Scale Scores in 2006



### Percentage of Students Enrolling in Higher Education

Table 2 compares the percentages of high school students graduating in the spring of 2007 who enrolled in a Texas higher education institution in the fall of 2007 by the performance level of the 8<sup>th</sup> grade TAKS reading and mathematics for incoming 9<sup>th</sup> grade students in 2004.

The performance level of the incoming 9<sup>th</sup> grade students was calculated by matching 9<sup>th</sup> grade students in 2004 with their 2003 8<sup>th</sup> grade TAKS scores. The TAKS scores had been converted to z-scores, a process which sets the average scale score to zero and makes the standard deviation of the distribution of scores equal to one. In this way, the reading and math scores could be combined into one z-score for all incoming 9<sup>th</sup> grade students.

The percentage of students enrolling in Texas higher education institutions was calculated by the Texas Higher Education Coordinating Board (THECB). There are two problems with this data. First, some students—especially immigrant students—do not have social security numbers, thus could not be tracked from high school to college. Second, students enrolling in institutions outside of Texas are not included in the data. Thus, the data are only rough estimates rather than precise counts and percentages of students.

As shown in the table, the greater the performance level of the incoming 9<sup>th</sup> grade students, the greater the percentage of students enrolled in higher education institutions and the in four-year colleges. With respect to community colleges, the percentage enrolled is a U-shaped curve, with the lowest percentages for high schools with the lowest and highest levels of performance for incoming 9<sup>th</sup> grade students.

Although there is a large degree of measurement error in the THECB data, the results suggest a fairly strong correlation between the 8<sup>th</sup> grade TAKS achievement level of incoming 9<sup>th</sup> grade students and the percentage of students enrolling in higher education.

Table 2: Percentage of Students Enrolling in Higher Education in 2007 by the 8<sup>th</sup> Grade TAKS English and Mathematics Performance Level of Incoming 9<sup>th</sup> Grade Students

Performance Level	Community College	Four-Year College	Higher Education
Lowest	16.8	17.4	34.2
Lower	23.0	20.3	43.3
Average	26.4	21.9	48.4
Higher	27.4	29.0	56.4
Highest	21.0	37.1	58.1
Total	24.9	23.5	48.3

**Section II: National Assessment of Educational Progress (NAEP)**

The National Assessment of Educational Progress (NAEP) is a test administered to students across the country. Students are sampled in such a way as to be representative of all students in a state, but not of individual schools or districts. The NAEP tests use a variety of test question types, including multiple choice, free-response, and constructed-response. The test is considered the “gold standard” of tests in the United States because of the high-quality.

**Comparison to Other States**

Over the last 17 years, as shown in Table 3, Texas students have increased achievement in overall mathematics and in Algebra by approximately one standard deviation—a fairly substantial gain over time. Put another way, Texas students in 2007 scored about three grade levels greater than their peers from 17 years prior. For Hispanic and African American students, the gain was closer to four grade levels. Thus, not only did all students make large gains over time, but African American and Hispanic students made the largest gains, thus closing the achievement gap between Whites and non-Whites.

In addition, Texas students scored at the same level or greater than peers in comparison states. Indeed, with only a few exceptions, Texas students statistically outperform their demographic peers in states that are large and diverse like Texas.

Table 3: NAEP Mathematics and Algebra Scale Scores for 8<sup>th</sup> Grade Students in Selected States by Student Racial/Ethnic Subpopulation (1990-2007)

State	Overall Mathematics					Algebra				
	1990	1996	2003	2007	Change	1990	1996	2003	2007	Change
<b>White</b>										
Texas	272	284	290	300	<b>27</b>	271	285	290	302	<b>31</b>
New York	273	283	293	290	<b>17</b>	271	282	283	294	<b>23</b>
Florida	265	277	286	289	<b>24</b>	264	280	287	292	<b>28</b>
California	270	277	283	287	<b>18</b>	269	276	287	294	<b>26</b>
Michigan	270	284	286	285	<b>15</b>	269	285	288	288	<b>19</b>
<b>Hispanic</b>										
Texas	234	249	260	271	<b>37</b>	233	252	262	276	<b>43</b>
New York	234	243	255	258	<b>24</b>	238	248	261	264	<b>26</b>
Florida	231	235	249	259	<b>29</b>	231	244	253	263	<b>32</b>
California	231	244	246	253	<b>21</b>	235	246	255	262	<b>27</b>
Michigan	231	245	245	244	<b>13</b>	233	252	249	251	<b>17</b>
<b>African American</b>										
Texas	245	255	267	277	<b>32</b>	242	257	268	279	<b>37</b>
New York	238	244	262	264	<b>26</b>	239	248	258	272	<b>33</b>
Florida	246	254	264	270	<b>25</b>	246	260	267	275	<b>29</b>
California	236	245	250	256	<b>20</b>	235	247	257	265	<b>30</b>
Michigan	na	na	267	259	<b>na</b>	na	na	272	264	<b>na</b>

As shown in Table 4, there were almost no gains in reading over the past nine years. Not only was this true for Texas, it was true for all the other comparison states as well with the exception of Florida White and African American students. Thus, while states were making substantial gains in 8th grade mathematics, the same states were essentially treading water with respect to 8<sup>th</sup> grade reading.

Table 4: NAEP Reading and Gaining Information Scale Scores for 8<sup>th</sup> Grade Students in Selected States by Student Racial/Ethnic Subpopulation (1990-2007)

State	Reading				Gaining Information			
	1998	2003	2007	Change	1998	2003	2007	Change
<b>White</b>								
Texas	271	272	275	<b>3</b>	272	272	276	<b>4</b>
New York	275	277	274	<b>0</b>	274	279	276	<b>1</b>
Florida	264	268	268	<b>4</b>	<b>262</b>	270	268	<b>5</b>
California	268	265	266	<b>-2</b>	267	265	266	<b>-1</b>
Michigan	—	<b>272</b>	267	<b>na</b>	—	<b>273</b>	267	<b>na</b>
<b>Hispanic</b>								
Texas	246	247	249	<b>3</b>	248	249	250	<b>2</b>
New York	246	246	246	<b>-1</b>	245	248	251	<b>5</b>
Florida	236	239	244	<b>8</b>	236	243	247	<b>11</b>
California	238	239	237	<b>-1</b>	235	240	239	<b>4</b>
Michigan	—	<b>242</b>	236	<b>na</b>	—	<b>242</b>	239	<b>na</b>
<b>African American</b>								
Texas	250	247	251	<b>1</b>	249	249	252	<b>3</b>
New York	247	250	246	<b>-1</b>	245	253	247	<b>1</b>
Florida	<b>247</b>	251	256	<b>9</b>	<b>247</b>	253	259	<b>12</b>
California	238	237	239	<b>2</b>	236	238	242	<b>5</b>
Michigan	—	257	241	<b>na</b>	—	265	242	<b>na</b>

**Racial/Ethnic Group Comparisons**

As shown in Table 5, the gap between White and African American and White and Hispanic students has decreased slightly over the last 17 years. However, the decreases occurred primarily between 1990 and 2003, with no change between 2003 and 2007 with the exception of the White-Hispanic gap. Moreover, when considering statistical significance, the gap has not closed between White and African American over the 17 years and has not closed for White and Hispanic students since 2000 (data not shown).

Table 5: NAEP Mathematics and Algebra Scale Scores and Achievement Gaps for 8<sup>th</sup> Grade Texas Students by Student Racial/Ethnic Subpopulation (1990-2007)

Student Population	Overall Mathematics					Algebra				
	1990	1996	2003	2007	Change	1990	1996	2003	2007	Change
White	272	284	290	300	<b>27</b>	271	285	290	302	<b>31</b>
Hispanic	234	249	260	271	<b>37</b>	233	252	262	276	<b>43</b>
African American	245	255	267	277	<b>32</b>	242	257	268	279	<b>37</b>
Gap: W – H	38	35	30	29	<b>-9</b>	38	33	28	25	<b>-13</b>
Gap: W – AA	28	29	23	23	<b>-5</b>	29	28	22	23	<b>-6</b>

Table 6: NAEP Reading and Gaining Information Scale Scores and Achievement Gaps for 8<sup>th</sup> Grade Texas Students by Student Racial/Ethnic Subpopulation (1990-2007)

Student Population	Reading				Gaining Information			
	1990	2003	2007	Change	1990	2003	2007	Change
White	271	272	275	<b>3</b>	272	272	276	<b>4</b>
Hispanic	246	247	249	<b>3</b>	248	249	250	<b>2</b>
African American	250	247	251	<b>1</b>	249	249	252	<b>3</b>
Gap: W – H	25	25	26	<b>1</b>	24	24	26	<b>2</b>
Gap: W – AA	22	24	24	<b>2</b>	22	23	24	<b>1</b>

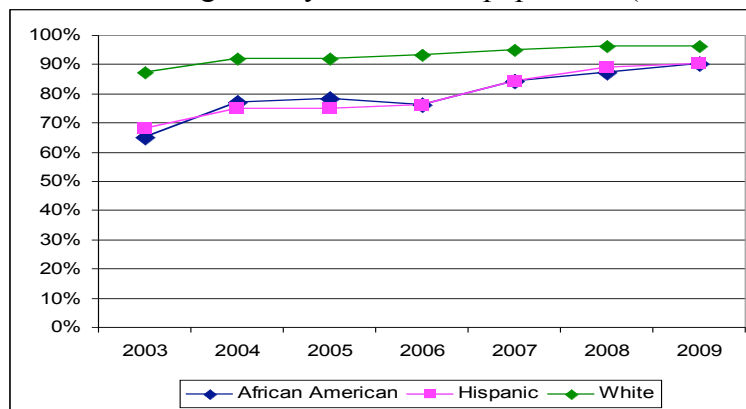
### Section III: Texas Assessment of Academic Skills (TAKS)

This section provides information from the Texas Assessment of Knowledge and Skills that has been administered since the spring of 2003. In 2008 and 2009, students had multiple opportunities to taker and pass the mathematics section of the assessment.

#### Percentage Passing Middle School TAKS over Time

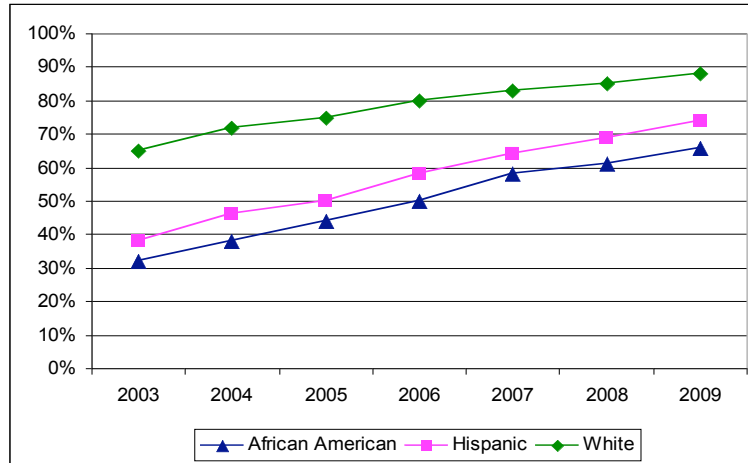
As shown in Figure 17, the percentage of students passing the 8<sup>th</sup> grade reading test has increased substantially over time. Of importance is the fact that almost all White students now pass the test. This is called a ceiling effect because the students can longer improve their performance no matter how much better they do on the actual test. Since this percentage can essentially no longer can increase, the achievement gap necessarily closes between White and non-White students.

Figure 17: Percentage of Texas Students Passing the TAKS 8<sup>th</sup> Grade Reading Test by Student Subpopulation (2003-2009)



As shown in Figure 18, the percentage of students passing the 8<sup>th</sup> grade TAKS mathematics test has also increased substantially over time. Note, however, that there is no ceiling effect evident in mathematics as in Reading.

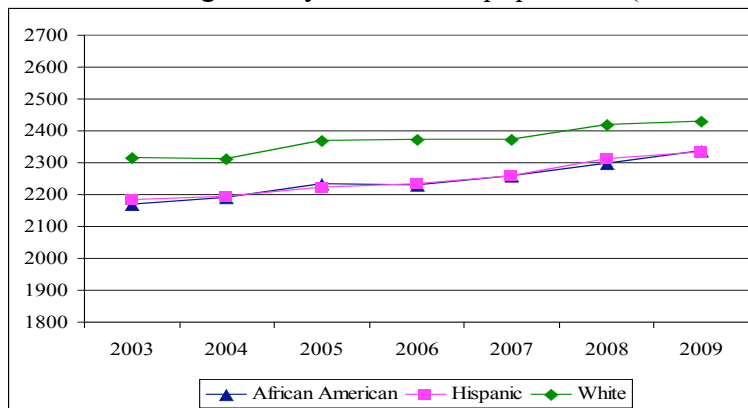
Figure 18: Percentage of Texas Students Passing the TAKS 8<sup>th</sup> Grade Mathematics Test by Student Subpopulation (2003-2009)



**Middle School Scale Scores over Time**

As shown in Figure 19, the average scale scores of students from each of the three major racial/ethnic groups increased from 2003 to 2009. Importantly, African American and Hispanic students are only now at the same scale score level as White students in 2003. Thus, African American and Hispanic students could be considered to be six years behind White students on the 8<sup>th</sup> grade reading TAKS test. In addition, in contrast to the graph using the percentage of students passing, this graph shows only a small closing of the racial/ethnic achievement gap on the 8<sup>th</sup> grade TAKS reading test.

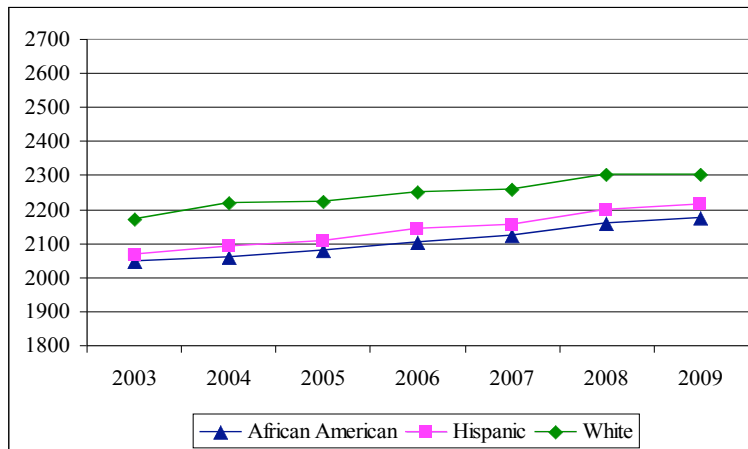
Figure 19: Average Scale Scores of Texas Students on the TAKS 8<sup>th</sup> Grade Reading Test by Student Subpopulation (2003-2009)



As shown in Figure 20, the average scale score for all three major racial/ethnic groups have increased steadily since 2003. However, the scale score for Hispanic students is about at the level of White students in 2004 and the average scale score for African American students is at the level of White students in 2003. Thus, Hispanic students could be considered five years behind White students and African American students could be considered six years behind White students on the 8<sup>th</sup> grade TAKS mathematics test. Further, in contrast to the graph using the percentage of students passing TAKS, this graph shows only a small narrowing of the achievement gap.

Figure 20: Average Scale Scores of Texas Students on the TAKS

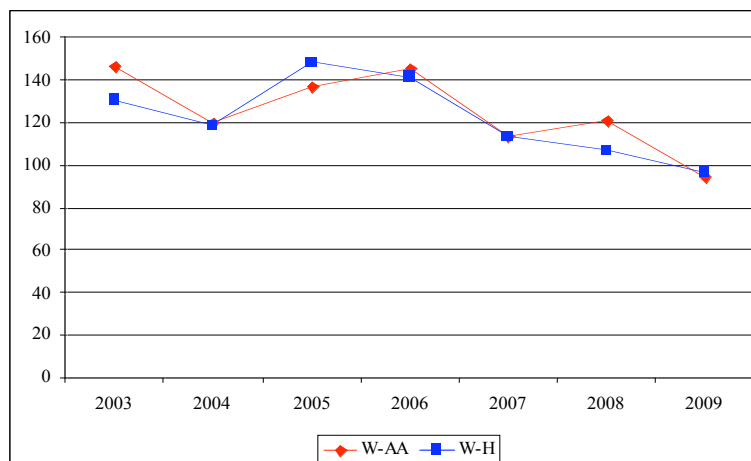
8<sup>th</sup> Grade Mathematics Test by Student Subpopulation (2003-2009)



**Middle School Achievement Gaps over Time**

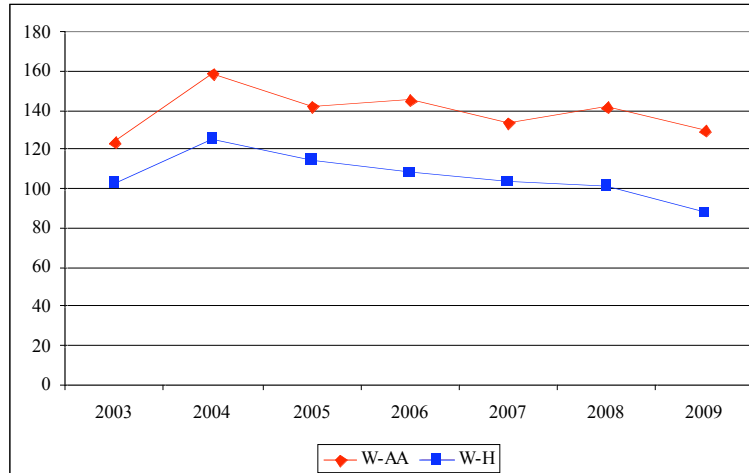
As shown in Figure 21, there has only been a small narrowing on the achievement gap on the 8<sup>th</sup> grade TAKS reading test. Moreover, what narrowing has occurred has been during the last two academic years when a substantial number of White students have achieved a perfect or near perfect score. Thus, the closing of the achievement gap is more than likely due to a ceiling effect rather than any true closing of the gap in knowledge and skills between White and non-White students

Figure 21: Average Scale Scores Achievement Gaps of Texas Students on the TAKS 8<sup>th</sup> Grade Reading Test by Student Subpopulation (2003-2009)



Likewise, as shown in Figure 22, there has been only a small narrowing of the achievement gap since 2003, although the gap has narrowed moderately since 2004. But the gaps are still sizeable and will take over a decade to fully close at the current rate of closure.

Figure 22: Average Scale Scores Achievement Gaps of Texas Students on the TAKS 8<sup>th</sup> Grade Mathematics Test by Student Subpopulation (2003-2009)



### Conclusions

This report is a preliminary analysis of the relationship between middle school achievement and high school outcomes for students and schools. Far more work needs to be done to fully investigate these relationships. Moreover, researchers need to bring to bear more sophisticated analyses and complete data sets so that we can fully grasp the complex nature of these relationships.

Despite the limitations of this study, the results do suggest that there is a strong positive relationship between middle school achievement and high school outcomes. More concretely, the greater the achievements in middle school, the more likely students are to:

- Remain in the Texas public school system;
- Advance to the high school on-time;
- Pass the 9<sup>th</sup> grade TAKS tests;
- Pass 9<sup>th</sup> grade Algebra I;
- Progress to 11<sup>th</sup> grade on-time; and,
- Meet college-readiness standards.

At the school level, the greater the 8<sup>th</sup> grade TAKS achievement of incoming 9<sup>th</sup> grade students, the greater the percentage of students:

- Passing Algebra I;
- Remaining in school;
- Meeting college-readiness standards; and,
- Enrolling in Texas institutions of higher education.

### **Policy Implications**

Because of the preliminary nature of this study, making concrete policy recommendations that will improve outcomes is difficult. However, some broad recommendations can be made about how the state can assist schools and school districts in preparing a greater percentage of students to meet rigorous college-readiness and workforce-readiness standards.

#### **State Policy**

The state can play a significant role in this area in a number of different ways.

##### **1) Ensure that families have access to adequate medical care and other health and human resources.**

Research is extremely clear—improving educational outcomes for all students will require a significant investment of time and resources in the educational realm as well as in the health and human services realm (See <http://www.boldapproach.org/> for a review of research in this area). Ensuring all children have access to health and social services and that their parent(s) have opportunities to make a livable wage at one job rather than at multiple jobs are critical to improving educational outcomes for all students, especially children from economically disadvantaged families. Thus, the state should expand CHIP, support affordable housing efforts, provide more access to free early childhood education, and provide incentives for local agencies to coordinate social services to families. In essence, we as a state must stop looking at the short-term outcomes of quarterly profits and property tax breaks and look at how we can invest long-term in the education and well-being of *ALL* children in this state.

##### **2) Shift more accountability pressure to the district level and away from the school level.**

Because elementary schools and even many middle schools have such a small number of students from subpopulations that not all student subpopulations are included in the accountability system, many students can be overlooked without any consequences to the

individual school. To counter this possibility, the state should shift more accountability pressure to the district and have rigorous expectations for all students in the district from each subpopulation.

**3) TEA should collect, analyze, and disseminate data on the number of students failing consecutive TAKS tests over time.**

What has become clear in this study and other studies is that a large number and percentage of students fail TAKS every year without making substantial progress towards meeting the low passing standard, much less a true college readiness standard. Many districts simply do not track students longitudinally in a way that identifies groups of students who never pass the TAKS test. Related to this effort, the state should add a district accountability measure that focuses on students failing TAKS repeatedly over time. Further, the state should require schools and districts to document the interventions used with such students and submit the documentation to TEA.

**4) Add a true growth measure and reconsider the Texas Projection measure.**

A number of researchers and policymakers from around the state and nation have serious concerns about the Texas Projection Measure (TPM). My fear is that the TPM takes the focus off of the students who need extra attention from school personnel. The state should carefully assess whether the TPM works to help students achieve at higher levels or simply takes the pressure off of schools to help students grow.

Regardless of whether TPM works, the state should use a growth model to assess the effectiveness of schools. As this report shows, the ability level; of incoming students to a school—especially high schools—largely determines the outcomes of the school. Yet, some schools make tremendous growth with their students and other schools do not. But the current accountability system simply does not capture such information

**5) Accurately report the achievement gap.**

For years, school districts and state education agencies across the nation have reported the achievement gap in terms of the percentage of students passing tests. This is an inaccurate and misleading method of measuring the achievement gap for a number of different reasons which will be explained in an upcoming issue brief. In fact, as I have shown, using the percentage of students passing the TAKS suggests a dramatic closing of the achievement gap, yet the NAEP and TAKS scale scores show only a very slight closing of the achievement gap if the gap has closed at all. Without good information and data analyses, policymakers at all levels can simply not make good decisions. Thus, rather than assessing the achievement gap using the percentage of students passing, TEA should move to using scale scores at each grade level and report the achievement gap in that way.

**6) Create a more equitable school finance system.**

As the NAEP data makes clear, almost all of the closing in the mathematics achievement gap occurred in the early and mid-1990s. While many policy makers have attributed this to the

implementation of the state accountability system, too many of us forget that the state finally adopted a more equitable and ethical school finance system around 1993. As I have pointed out elsewhere, Texas had one of the most inequitable school finance systems before 1993, but had created one of the most equitable systems by 1998. The massive influx of new money to poor districts serving largely economically disadvantaged and minority students

### **7) The state should adopt a more rigorous college readiness standard.**

As the NCEA report made clear, the college readiness standard set by the state was simply too low of a standard to ensure large percentages of students were truly college ready. To communicate that students are college ready if they score at 2200 or above does a disservice to the students, K-12 schools, and higher education institutions across this state. The state could instruct an Education Research Center to conduct a more thorough and sophisticated analyses of where the college readiness standards should be, especially with respect to the new end-of-course tests.

### **8) The state needs to re-assess the entire testing and accountability system.**

The current system is simply not aligned to preparing students to be college ready. Rather than building such a system, we have retroactively applied college-readiness standards to an existing system.

My exploratory analyses using existing state data suggest that the 8<sup>th</sup> grade mathematics TAKS does not effectively assess algebraic thinking well enough and over a large enough number of items to be used to assess whether schools are adequately preparing students for the rigors of Algebra I. Further, the correlation between the 8<sup>th</sup> grade mathematics TAKS and the Algebra I End-of-Course test is extremely low for two tests that should have overlapping material. If my assessment is correct and the state moves forward without correcting this problem, schools and districts will have little guidance from the TAKS as to whether students are prepared for the Algebra I End-of-Course test.

Further, for new and future tests, the state needs to ensure that tests have no ceiling effect. In reading, far too many students have hit the ceiling for the test results to provide us little useful information.

### **9) The state should create a new testing system that provides less of an incentive to “teach to the test” and will reduce score inflation.**

As my study and other studies have shown, the current testing and accountability system provides strong incentives to teachers to “teach to the test”, thus narrowing the curriculum. When the curriculum is narrowed, students are not taught the full curriculum.

One impractical solution is to simply make the tests longer so that they cover more material. This, however, would be problematic for many students who could simply not concentrate long enough to answer questions on a longer test.

A different and much more practical and effective solution is to require all students to answer a set number of questions, but then sample students on other material similar to the way NAEP samples knowledge and skills from students. More specifically, each student would answer X number of the same questions, then answer Y questions from a larger pool of

questions. Not every student would answer the same Y questions. In fact, most students would answer different Y questions. The Y questions would not be tied to the individual student, but would be aggregated to the school or district level to be used in assessing the overall knowledge and skills of students over a much broader range of the true curriculum.

**10) Better prepare teachers and schools to instruct special education and English Language Learner students.**

Many of our lower performing students are special education and English Language Learner students. Because a majority of our teachers come from alternative certification programs that provide little, if any, training on how to effectively instruct such students, the state needs to re-assess what we require of teacher preparation programs while also financially supporting systemic professional development programs that provide teachers the knowledge and skills to effectively instruct such students so that they reach their educational potential.

**11) Carefully examine how we prepare and assess elementary and middle school mathematics and science teachers.**

Currently, prospective teachers could correctly answer less than 50% of the mathematics or science questions on the Texas Examination of Educator Standards, yet still be certified to teach mathematics. The same is true for science. The state should analyze the extent to which this happens and perhaps change how teachers are assessed based on the findings from the analysis.

**12) Support more research into these and other important public education issues.**

The state should invest more time and effort into conducting research into these and other important issues related to Texas public education. This could be advanced through more funding for the Education Research Centers (ERCs), increasing the efficiency and flexibility of the ERC process, supporting more in-house research at TEA with the addition of more well-qualified researchers, and improve the grants and contracts procedures at TEA to ensure evaluations and research are of high-quality. TEA has already made improvements in these areas and should be commended for doing so, yet much more work needs to be done to improve the process.

**District Policies**

**1) Clearly, districts need to ensure that a far greater percentage of students are adequately prepared for high school than is currently the case.**

Districts need to adopt strategies and policies (some of which are discussed below) to ensure that students are at least within arm's reach of being ready to tackle high school level work. Far too many students are clearly not anywhere close to being ready for high school. These are precisely the students who end up failing high school TAKS, repeating the 9<sup>th</sup> grade, and dropping out of school. The human and fiscal implications of this lack of high school readiness are staggering.

**2) Either by themselves or with assistance from TEA, Region Education Service Centers, P-16 Councils, Universities, or Education Research Centers, districts should create data systems that track student performance longitudinally and identify those students failing TAKS test in consecutive years.**

Although the state should certainly be capable of providing such information to each district, the districts should add locally derived information about attendance, course grades, and other information as a way to identify students at-risk of falling behind their peers before high school. Districts should use such data to identify these struggling students, then commit resources to providing effective interventions before students reach high school. Further, the districts should document the details of the interventions and provide such information to the state so that research could be conducted to determine some best practices.

**3) Districts should provide incentives for experienced and effective teachers to teach 9<sup>th</sup> grade courses.**

All of the data on student achievement points to 9<sup>th</sup> grade as a year of reckoning for many students. As this study has shown, far too many students are simply not prepared for high school work. But, many students are marginally prepared for high school and could certainly succeed under the right circumstances. Yet, most high schools place their least experienced and least prepared teachers in 9<sup>th</sup> grade courses. Moreover, class sizes in 9<sup>th</sup> grade classes tend to be larger than other classes. Thus, rather than creating situations in which students have a reasonable chance to be successful, many schools create situations that make it more difficult to be successful.

**4) Districts should provide effective professional development on how to effectively assess and instruct special education and English Language Learner students to all teachers and administrators.**

Although I have little evidence other than anecdotal information, my colleagues and I strongly believe that far too many special education and English Language Learner students do not receive the proper assessments, modifications, and instruction that they need to maximize their potential and meet college readiness standards.