

Appendix E – Student Growth Measures

When the Texas Assessment of Knowledge and Skills (TAKS) testing program was implemented in 2003, a new growth measure, the Texas Growth Index (TGI), was introduced. The TGI provides an estimate of a student's academic growth on the TAKS tests, over two consecutive years and in two consecutive grades. Between 2004 and 2009, the TGI was calculated for students in grades 4-11 for reading and mathematics. The TGI for science and social studies was calculated only for grade 11 because grades 10 and 11 were the only consecutive tested grades for these two subjects.

The TGI did not meet the requirements for growth-based accountability for the U.S. Department of Education (USDE) growth pilot. Therefore, when the USDE pilot growth program was announced and student growth legislation in Texas was passed, Texas began researching alternatives for growth measures that would satisfy both federal and state requirements. Ultimately, the Texas Projection Measure (TPM) was selected as the best option. The TPM was implemented in 2009. In 2010 the TPM is available for all grades and subjects except writing in grade 7 and all subjects in grade 11.

Due to new state legislative requirements, vertical scales were also developed in 2009 for TAKS reading and mathematics tests in grades 3–8 (including Spanish reading and mathematics in grades 3-6). Vertical scales are not reported for TAKS writing (grades 4 and 7), science (grades 5, 8, 10, and exit level), social studies (grades 8, 10, and exit level), reading and mathematics at grade 9, and English language arts and mathematics at grade 10 and exit level. Student performance results on these assessments continue to have a scale score of 2100 for Met Standard and 2400 for Commended Performance. In the grades and subjects with vertical scales, the TGI cannot be calculated. With a vertical scale, a student's scale score in one grade can be compared to the student's scale score in another grade as long as the scores are in the same language and subject. The growth in vertical scale scores will be referred to as Vertical Scale Growth (VSG).

Both the TPM and vertical scale score growth provide information about student progress through the Texas educational system. The TPM focuses on future performance and vertical scale score growth focuses on past performance. The TPM is a projection; vertical scale score changes are actual changes in performance. An advantage to the vertical scale is that it enables the progress of students who have different initial proficiency levels to be compared.

For the 2009-10 school year, TGI, VSG, and TPM values were calculated. This appendix describes the use of these three growth measures in the 2010 state accountability system.

TGI METHODOLOGY

With TGI, a student's growth is defined as the student's score in Year 2 minus the student's projected score for Year 2. A student's projected score for Year 2 is the score in the distribution at Year 2 that corresponds to the student's Year 1 score. If the student's score is above the expected score, the student is considered to have grown. If the student's score is below the expected (projected) score, the student is considered to have regressed. Expected growth is defined as maintaining location in the distribution year to year.

To determine the TGI for an individual student, growth equation parameters are needed for each subject and grade. The parameters used to determine TGI, shown in the *Table 38*, below

were developed using the empirical data from the base comparison years — spring 2003 to spring 2004.

Steps for determining a TGI value for a sample student are shown in *Table 39*.

Table 38: TGI Growth Equation Parameters – Grade 11

Growth Grades	Subject	Starting Point	Increase	Adjustment
10-11	Math	-138.428	1.092	104.38
10-11	Science	410.23	0.832	75.94
10-11	ELA	128.38	0.962	96.41
10-11	Social Studies	464.43	0.810	93.98

TGI growth equation parameters were calculated based on TAKS scale score changes between spring 2003 and spring 2004. These base calculations have been applied in each subsequent year.

Table 39: Sample TGI Calculation

In this example, a student’s mathematics growth from grade 10 to grade 11 is examined. The student had a scale score of 2188 in grade 10 and a scale score of 2161 in grade 11.

	STEPS	EXAMPLE VALUES
Step 1	Find the starting point for that student in the row of the table that matches that student’s grade and subject.	-138.428
Step 2	Take the student’s scale score in the first year.	2188
Step 3	Find the increase for that student in the row of the <i>Table 37</i> that matches that student’s grade and subject.	1.092
Step 4	Multiply student’s scale score from the first year by the increase.	$2188 \times 1.092 = 2389.296$
Step 5	Add the amount from Step 1 and the total from Step 4. This is the expected student scale score for the second year .	$-138.428 + 2389.296 = 2250.868$
Step 6	Take the student’s scale score from the second year and subtract the expected student score from it. This number is the difference in expectation .	$2161 - 2250.868 = -89.868$
Step 7	Calculate Adjusted TGI by dividing the result from Step 6 by the Adjustment factor shown on the appropriate row of the table. Round to the second decimal place.	$-89.868 / 104.38 = -0.86$
Step 8	If the difference in expectation is positive, that student grew more than expected. If the difference in expectation is negative, that student grew less than expected.	Since -0.86 is negative; the student grew less than expected.

TPM METHODOLOGY

The TPM estimates whether a student is likely to pass TAKS assessments in the next high-stakes grade (grade 5, 7 [writing only], 8, or 11).

The TPM is reported in mathematics, reading, ELA, science, social studies, and writing.

Projections for each student are made separately for each subject. When projections are made

to a future grade, the result is a projected score. To determine if a student is projected to meet the standard or not in the projected grade, the projected score is compared with the Met Standard cut point in the projected grade and subject.

Resources related to the TPM are available at http://www.tea.state.tx.us/index3.aspx?id=8351&menu_id=793

Resources at this site include the following:

- Online TPM Calculator
- Step-by-step procedures for calculating the TPM
- A listing of district and campus subject means
- Procedures for developing the TPM equations
- TPM Frequently Asked Questions documents

Additional information on the TPM is posted at this website as it becomes available.

VERTICAL SCALE SCORE GROWTH METHODOLOGY

Vertical Scale Growth (VSG) is defined as a student's vertical scale score in Year 2 minus the student's vertical scale score in Year 1. Vertical scale scores can be compared across years as long as the comparison is for the same subject area and language version.

USES OF STUDENT GROWTH MEASURES IN 2010 STATE ACCOUNTABILITY

TGI:

In 2010, the TGI continues to be used as a component of the TAKS Progress Indicator under the alternative education accountability (AEA) procedures; however, its use is limited to grade 11 students only. For other grades, the TPM is used. See *Chapter 10 – AEA Base Indicators* for details on the use of TGI and TPM in the calculation of the TAKS Progress Indicator under AEA procedures.

VSG:

Prior to 2010, the TGI was used to calculate Comparable Improvement (CI), an acknowledgment awarded under the Gold Performance Acknowledgment (GPA) system for campuses evaluated under standard procedures. CI is awarded separately for reading and mathematics. With the transition to the use of a vertical scale for reading and mathematics in grades 3-8, the TGI is no longer available for CI for these grades and subjects. Instead, beginning in 2010, VSG will be used to determine CI.

An average VSG value for each campus is determined by aggregating the student-level VSG values to the campus level.

Who are included:

Students are included in a school's CI calculation if they:

- took the spring 2010 TAKS reading and/or mathematics tests, in grades 4 – 8.
- are part of the 2010 *Accountability Subset* (see *Chapter 2*);

- can be matched to the spring 2009 TAKS administration—anywhere in the state—to find their prior year performance for reading, and/or mathematics; and,
- have been promoted to one higher grade than in 2009.

Calculating Average VSG*:

$$\text{average VSG(reading)} = \frac{\text{sum of individual student VSG values for reading}}{\text{total number of students with VSG in reading}}$$

$$\text{average VSG(mathematics)} = \frac{\text{sum of individual student VSG values for mathematics}}{\text{total number of students with VSG in mathematics}}$$

*Note: In *Chapter 5 – Gold Performance Acknowledgments*, the formula for calculating the campus average VSG was expressed differently; however, mathematically the results are the same.

Once the average VSG is determined, it is listed with the other 40 average VSGs of the school’s comparison group. The schools are arranged from highest to lowest average VSG. If the target school falls in the top quartile and all other eligibility criteria are met, it is awarded a GPA for CI. This is calculated separately by subject.

Other information:

- *Retesters.* For students who take TAKS retest administrations in the SSI grades—grades 5 and 8 reading and mathematics—the VSG is determined using the scale score from the first administration. This is true for both Year 2 and Year 1.
- *Quartile Size.* Because there are 40 schools in a comparison group, there are usually 10 schools in each quartile (with the target school being the 11th school in its quartile). Exceptions to this occur when a group has tied average VSG values at the border between quartiles, or when a school in a group has too few “matched students,” and is therefore not assigned an average VSG value or a quartile. This will cause the number of schools in each quartile to vary.
- *Quartile Rank.* High growth values do not necessarily imply that more students are passing the TAKS. It simply evaluates the performance growth of all students regardless of whether they passed or failed.
- *Quartile Position Across Subjects.* A school’s quartile position can vary by subject. For instance, a school may be Q1 in reading, but it may be Q2 in mathematics. Quartile position is relative to the performance of the other schools in the group.
- *Quartile Position Across Groups.* A school may be Q1 for its own group and Q4 as a member of another school’s group. (However, the quartile value evaluated for a particular school is the one determined for the school’s own group.)
- *Minimum Size.* Any school with fewer than 10 matched students for a subject will not have average VSG values calculated and will not be assigned a quartile position.
- *Number of Matched Students.* The number of matched students for reading may differ from the number of matched students for mathematics.
- *Range of Vertical Scale Scores Across Grades.* The distance in vertical scale score points between the Met Standard performance levels varies across adjacent grades. Collapsing

vertical scale growth across grade spans (as is done with the new CI methodology) requires the assumption that students have an equal opportunity for growth as they move from grade to grade. Additional study will be conducted prior to the 2011 development cycle to determine if adjustments to the use of vertical scales with CI are advisable. Because CI comparison groups are based on campus type (elementary, middle, high school, multi-level), the grade spans of schools compared for CI acknowledgment in 2010 will be similar.

For a more detailed explanation of *Gold Performance Acknowledgment*, see the *Chapter 5 – Gold Performance Acknowledgments*.

USES OF TPM IN 2010 STATE ACCOUNTABILITY

As explained above, the TPM is used under AEA procedures as a component of the TAKS Progress Indicator. Under standard procedures the TPM is used as an additional feature of the system as a means of elevating a campus or district rating when neither the “Percent Meeting the Standard” nor Required Improvement is sufficient to achieve the next higher rating. The TPM offers an alternative approach to demonstrating achievement that meets state goals. See *Chapter 3 – The Basics: Additional Features* and *Appendix D – Data Sources* for more information about how the TPM is used in determining standard accountability ratings.

Table 40: Student Growth Measures and 2010 Accountability

Measure	Description	Grades and Subjects	Years in Use	Use in Accountability
TGI	Estimate of growth	Consecutive years in consecutive grades	2004 – 2009	<ul style="list-style-type: none"> • CI–GPA • TAKS Progress Measure–AEA
			2010	TAKS Progress Measure–AEA
TPM	Projection of future performance	<ul style="list-style-type: none"> • Projects to high stakes grades (5, 7 [writing only], 8, and 11) • N/A for grade 7 writing • N/A for grade 11 	2009 and 2010	<ul style="list-style-type: none"> • Additional Feature–Standard Procedures • TAKS Progress Measure–AEA
VSG	Actual change	<ul style="list-style-type: none"> • 4-8 reading and mathematics 	2010	CI–GPA

