

Update to “An Investigation of Growth Indices Obtained Using Value Tables”

Introduction

The investigation that was presented to the Academic Standards and Assessments Subcommittee in January and to the full Education Oversight Committee (EOC) in February revealed that the absolute and growth indices for elementary and middle schools obtained by using the current value table are substantially more highly correlated than prior to the implementation of the value table. One reason for creating both absolute and growth measures of school achievement is to assess schools in two different ways, motivated by the belief that these measures should not be related (correlated) to one another. When considering alternative value tables, one goal for selection is to minimize the relationship (correlation) between the absolute and growth indices. A second goal is that the percentage of schools receiving each growth rating should not differ markedly from the percentage receiving each growth rating 2009 through 2011.

Based on work previously completed, alternative value tables 2 and 3 will be further considered. Alternative value table 1 was not considered for further analysis because the correlation between absolute and growth indices was .99 for both elementary and middle schools, indicating that although the intent was to create two different measures of school performance, these measures are not providing different information. However, a variation of alternative value table 1 was considered. This 4th alternative value table provides increasing rewards to students for maintaining achievement at successively higher levels, as did alternative value table 1. The major difference is that the increment in reward for each successively higher level is 2 points rather than 10 points. A smaller difference is that greater rewards are made for students who increase their achievement by larger amounts. A more detailed explanation of the development of alternative table 4 is provided later in this document.

Regardless of the specific growth table employed, the methodology of computing a growth index is as follows:

- Only students who had PASS scores for the current and previous year are used in this process.
- For each subject area, a student is awarded a number of points based on a student's test score performance in year one (pretest) and year two (posttest), as determined by the growth table.
- The mean number of points is then computed for each subject area
- The subject area mean scores are averaged to create the growth index, a number which is rounded to the hundredths (.01) place. For elementary schools the subject area means are weighted to place more emphasis on reading and mathematics (.3 reading, .3 mathematics, .2 science, .2 social studies), while for middle schools all subjects are weighted equally (.25).
- From the growth index, growth ratings are assigned using a conversion table.
- Growth ratings may be increased one level if either:

- The growth index for a historically underachieving group exceeds the state two-year average growth index by at least one standard deviation (HUG adjustment), or
- If the absolute rating for a schools is Excellent for both the current and previous year.

Current Growth Ratings

Using the current value table with the application of HUG adjustments and adjustments that increase the growth rating for schools that received Excellent absolute ratings for both the current and previous year, the percentages of schools receiving each report card rating for 2010 and 2011 are as follows:

Table 1. Percent of Schools Receiving each Growth Rating for 2010 and 2011.

Growth Rating	2010			2011		
	Elementary	Middle	All	Elementary	Middle	All
Excellent	12	3	9	24	18	22
Good	20	9	16	20	22	20
Average	55	62	57	46	45	45
Below Average	8	17	11	8	9	8
At Risk	5	10	7	4	6	4

The 2010 growth ratings are the first ratings that were obtained using PASS data for both years in the computation of the growth ratings, and will be used as the reference year. Results from 2010 have the added advantage of providing a distribution of ratings for elementary and middle schools combined that is nearly symmetric with the majority of schools receiving growth rating of Average. Using this distribution as a reference will allow sensitivity to changes in school growth ratings – both increases and decreases.

When examining each alternative value table, adjustments for HUGS and for two consecutive years of Excellent absolute ratings were not made, so that comparisons could be made of the various value tables only. In 2010 35 schools received HUG adjustments to their growth rating and 20 schools received adjustments for having absolute ratings of excellent for two years (55 total). In 2011 22 schools received HUG adjustments and 108 schools received adjustments for having absolute ratings of excellent for two years (130 total). Almost all of these adjustments raise the growth rating of a school from Good to Excellent. Given the different number of adjustment made to the growth ratings by year, to compare schools after these adjustments have been made would confuse comparisons across years, especially because the number and percentage of schools with Good and Excellent ratings is of great importance when making these comparisons. Consider the data presented above for 2010 and 2011. In 2011, 22 percent of schools received a growth rating of Excellent while in 2010, only 9 percent of the schools received a growth rating of Excellent. This difference is due to the larger number of schools that received adjustments to their growth ratings in 2011. To enable the most straight-forward comparisons among value tables, the adjustments are not being considered here

Current Value Table

The current value table was created to encourage students to achieve the status of Met by awarding 20 points more for a year two status Not Met 2 than Not Met 1, and for Met than Not Met 2. Increasing achievement above the level of Met is rewarded by an additional 10 points to Exemplary 4, and to Exemplary 5.

Table 2. Current Value Table

Year One (Pre-test)	Year Two (Post-test)				
	Not Met 1	Not Met 2	Met	Exemplary 4	Exemplary 5
Exemplary 5	40	60	80	90	100
Exemplary 4	50	70	90	100	110
Met	60	80	100	110	120
Not Met 2	70	90	110	120	130
Not Met 1	80	100	120	130	140

Below are the percentages of schools receiving each report card rating where there are no adjustments for historically underachieving groups (HUG) or for receiving absolute ratings of Excellent in the current and previous year.

Table 3. Percent of Schools with each Growth Rating for 2010 and 2011 using the Current Value Table with No Adjustments.

Growth Rating	Range of Indices	Percent of Schools		
		2010	2011	Both Years
Excellent	98.48 or above	4	9	7
Good	96.39 to 98.47	20	30	25
Average	92.20 to 96.38	59	49	54
Below Average	90.11 to 92.19	11	8	9
At Risk	90.10 or below	6	4	5

Alternative 2

Alternative 2 rewards students who maintain the same level of achievement with 100 points, with an additional 10 points awarded for each increase in year two achievement level, and a decrease of 10 points for each decrease in year two achievement level.

Table 4. Alternative Value Table 2

Year One (Pre-test)	Year Two (Post-test)				
	Not Met 1	Not Met 2	Met	Exemplary 4	Exemplary 5
Exemplary 5	60	70	80	90	100
Exemplary 4	70	80	90	100	110
Met	80	90	100	110	120
Not Met 2	90	100	110	120	130
Not Met 1	100	110	120	130	140

Below are the percentages of schools receiving each report card rating using alternative table 2. Again, there are no adjustments for historically underachieving groups (HUG) or for receiving absolute ratings of Excellent in the current and previous year. The ranges of indices associated with each report card rating were selected to create a distribution of report card ratings that is similar to the combined (elementary and middle school) growth ratings obtained in 2010. The distribution of report card ratings matches the 2010 distribution reasonably well. Also note that without adjustments due to HUG or 2 years of Excellent absolute ratings, the differences in the distributions of ratings for 2010 and 2011 are small.

Table 5. Percent of Schools with each Growth Rating for 2010 and 2011 using Alternative 2 with No Adjustments.

Report Card Rating	Range of Indices	Percent of Schools		
		2010	2011	Both Years
Excellent	101.52 or above	9	6	8
Good	100.71 to 101.51	16	14	15
Average	98.80 to 100.70	58	54	56
Below Average	97.92 to 98.79	11	15	13
At Risk	97.91 or below	5	11	8

Alternative 3

Alternative 3 is a small modification of Alternative 2 where students initially scoring Not Met 1 or Not Met 2 receive 20 additional points for increasing their achievement by one level rather than 10 points as in alternative 2. Further increases in achievement are rewarded by an additional 10 points.

Table 6. Alternative Value Table 3

Year One (Pre-test)	Year Two (Post-test)				
	Not Met 1	Not Met 2	Met	Exemplary 4	Exemplary 5
Exemplary 5	60	70	80	90	100
Exemplary 4	70	80	90	100	110
Met	80	90	100	110	120
Not Met 2	90	100	120	130	140
Not Met 1	100	120	130	140	150

Below are the percentages of schools receiving each report card rating using alternative table 3. Again, there are no adjustments for historically underachieving groups (HUG) or for receiving absolute ratings of Excellent in the current and previous year. The ranges of indices associated with each report card rating were selected to create a distribution of report card ratings that is similar to the combined (elementary and middle school) growth ratings obtained in 2010. Again, both the 2010 and 2011 distributions of report ratings are very similar to the target distribution from 2010.

Table 7. Percent of Schools with each Growth Rating for 2010 and 2011 using Alternative 3 with No Adjustments.

Report Rating	Card	Range Indices	of	Percent of Schools		
				2010	2011	Both Years
Excellent		103.05 or above	9	7	8	
Good		102.10 to 103.04	18	17	17	
Average		99.89 to 102.09	56	50	53	
Below Average		98.84 to 99.88	11	16	14	
At Risk		98.83 or below	6	11	8	

Alternative 4

Alternative Table 4 is variation of Alternative 1, which had as its dominant feature increasing rewards for students who maintained their achievement at successively higher levels. In Alternative 4, however, the increment in points awarded at successively higher levels is 2 points rather than the 10 points in alternative 1. Thus, students who maintain achievement at the level Not Met 1 are awarded 96 points and students who maintain achievement at the level Exemplary 5 are awarded 104 points.

It was hoped that by creating a value table with smaller increments of reward for students who maintained their achievement at successively higher levels (2points) compared to alternative table 1 (10 points) that the correlation between absolute and growth indices would decrease substantially. Alternative 4 also places a greater emphasis on increasing student achievement by incrementing the points awarded by larger amounts for students who increase their achievement to higher levels.

Table 8. Alternative Value Table 4

Year One (Pre-test)	Year Two (Post-test)				
	Not Met 1	Not Met 2	Met	Exemplary 4	Exemplary 5
Exemplary 5	55	59	69	84	104
Exemplary 4	57	67	82	102	127
Met	65	80	100	125	155
Not Met 2	78	98	123	153	188
Not Met 1	96	121	151	186	226

Below are the percentages of schools receiving each report card rating where there are no adjustments for historically underachieving groups (HUG) or for receiving absolute ratings of Excellent in the current and previous year. These percentages also are similar to those in the target distribution from 2010.

Table 10. Percent of Schools with each Growth Rating for 2010 and 2011 using Alternative 4 with No Adjustments.

Report Card Rating	Range of Indices	Percent of Schools		
		2010	2011	Both Years
Excellent	105.55 or above	10	7	9
Good	103.72 to 105.54	16	13	15
Average	99.24 to 103.71	58	56	57
Below Average	97.92 to 99.23	11	14	13
At Risk	97.91 or below	5	9	7

RESULTS

Correlations

Alternative value tables 2 and 3 again minimize the correlations between absolute and growth indices, and between growth and poverty indices. Using alternative table 2 the correlations between absolute and growth indices are approximately .15 for elementary schools and .49 for middle schools. Using alternative table 3 the correlations between absolute and growth indices are approximately -0.7 for elementary schools and .17 for middle schools.

Using alternative table 4 the correlations between absolute and growth indices are approximately .42 for elementary schools and .72 for middle schools. As previously stated, it was hoped that by creating a value table with smaller increments of reward for students who maintained their achievement at successively higher levels (2 points) compared to alternative table 1 (10 points) that the correlation between absolute and growth indices would decrease substantially. It did decrease, however, not by enough to be able to view absolute and growth indices as distinct measures of school effectiveness.

Table 11. Correlations among Absolute, Growth, and Poverty Indices for each Alternative Table for 2010 and 2011.

School Type	Value Table	Year	Correlation			
			Absolute with Growth	Absolute with Poverty	Growth with Poverty	
Elementary	Alternative 2	2010	0.21	-0.82	0.02	
		2011	0.04	-0.80	0.15	
	Alternative 3	2010	-0.05	-0.82	0.24	
		2011	-0.17	-0.80	0.32	
	Alternative 4	2010	0.48	-0.82	-0.22	
		2011	0.34	-0.80	-0.09	
	Middle	Alternative 2	2010	0.51	-0.87	-0.36
			2011	0.47	-0.83	-0.29
Alternative 3		2010	0.16	-0.87	-0.03	
		2011	0.19	-0.83	-0.01	
Alternative 4		2010	0.73	-0.87	-0.57	
		2011	0.71	-0.83	-0.51	

Changes in Ratings:

Should any of the alternative value tables be adopted, there will be changes that would occur between growth ratings obtained in 2012 using the current growth table, and in 2013 with a different growth table. With available data, this can be approximated by comparing the growth rating obtained using an alternative value table to the growth rating obtained using the current value table. An increase in growth rating of one level was assigned a change of +1 (e.g., from Average to Good), whereas a decrease in growth rating of one level was assigned a change of -1 (e.g., from Average to Below Average).

To gain some perspective on whether the observed differences are reasonable, a comparison will be made with changes in ratings that occurred from 2010 to 2011.

Table 12. Percent of Schools Changing Growth Ratings.

Comparison	Decrease in Rating				No Change	Increase in Rating			
	-4	-3	-2	-1	0	+1	+2	+3	+4
2010-2011	<1	0	9	31	50	9	2	0	0
Current – alternative 2	<1	1	9	27	43	14	6	<1	<1
Current – alternative 3	<1	1	11	25	37	16	8	1	<1
Current – alternative 4	<1	<1	4	28	49	13	4	<1	0

Consider the changes between the current growth rating and either alternative tables 2. A smaller percentage of schools have no change in their growth rating, and a larger percentage of schools with different ratings increased their rating than decreased their rating. A similar pattern emerges for changes between the current growth rating and growth ratings from alternative table 3. Fewer schools maintain the same rating than with alternative table 2, however the same pattern emerges where a larger percentage of schools with different ratings increased their rating than decreased their rating.

Changes that occur between current ratings and alternative 4 are more similar to those that occur from 2010 to 2011. Recall that for alternative 4 the correlation between absolute and growth ratings is substantially higher. As a result, we would expect that the changes observed in ratings would be similar to those observed from 2010 to 2011, which also has higher correlations between absolute and growth indices.

Conclusions:

- 1) For each of the alternative tables, the distribution of growth ratings obtained in 2010 can be recreated. Because the largest percentage of schools receive growth ratings of Average, this distribution ensures that the growth ratings are sensitive to both increases and decreases in school growth ratings.
- 2) In order to minimize the association between absolute and growth indices, alternative tables 2 or 3 would be the most viable choices.
- 3) Alternative table 4 yields correlations between absolute and growth indices that are too large to claim that these measures are independent indicators of school effectiveness.
- 4) Growth ratings will change more from year-to-year, however, the amount of change is not inconsistent with previous experience.