How Would Pennsylvania's Public Schools Perform On The Nation's Report Card?

Mapping PSSA Reported Proficiencies to the NAEP Scale in Math and Language Arts Skills for All Pennsylvania Schools and Districts

David V. Anderson
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Executive Summary

Nearly every state in the United States administers achievement tests to public school children in the K-12 years to determine, among other things, who is proficient (at or above grade level) in reading and mathematics skills. The United States federal government also administers the National Assessment of Educational Progress (NAEP), which is also known as the Nation's Report Card, which likewise measures the percentages of children who are proficient in these same two areas.

Important characteristics of the NAEP include:

- A long track record of 37 years, establishing itself as the defacto national standard for achievement.
- Content standards tested by the NAEP are drawn from the National Assessment Governing Board.
- The NAEP achievement level of "proficient" defines and measures what it is to be at "grade level."
- NAEP tests children in 4th and 8th grades and reports proficiencies at the state level.
- In 12th grade NAEP reports only at the national level.
- The use of statistical sampling techniques prevents reporting at district and school level.

State administered achievement tests, including Pennsylvania's, are characterized by:

- Testing sufficient numbers of children to report scores at the school and district levels.
- Testing in a variety of subject areas and always including mathematics and reading skills.
- Setting the achievement standards significantly lower than the NAEP.
- In the case of Pennsylvania, inflating its proficiencies about 80% above the NAEP results.

As we noted, the NAEP exam scores are not available for individual schools districts or schools. Thus local stakeholders are left in a quandary as to the proficiency percentages in their school or district because they can't rely on the inflated results from the state administered exams. In this report we:

- Provide a method to convert state reported proficiencies to more realistic NAEP aligned results.
- Confirm that the method's accuracy is sufficient to ensure reliable results.
- Use the method on ethnic groups to confirm the "soft bigotry of low expectations."
- Make available NAEP scale estimates for all public schools and districts within Pennsylvania.

These estimates predict what the Nation's Report Card would have reported for all K-12 public schools and districts in Pennsylvania. We find that very few schools or districts have more than half of their students proficient. Statewide in Pennsylvania, only 40% of 4th graders exceed the mark and by 11th grade it is only 31%. In nine Philadelphia high schools not even 3% of their students are estimated to be proficient. Thus, it may not be an exaggeration to describe such schools as custodial care centers where the academic development of children is not given a high priority. The consequent waste of human potential in these children is sad. We argue that social promotion causes of much of this and we discuss how to end it.

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What is a Passing Grade?

The nationally administered examinations of the National Assessment of Educational Progress (NAEP) are achievement tests that, among their other purposes, measure if students are performing at grade level. Generally, students are tested in 4th, 8th, and 12th grades. In each examination there are four possible "grades" given:

1. **Below Basic:** The student performs more than one-year below grade level
2. **Basic:** The student performs essentially one-year below grade level
3. **Proficient:** The student performs at grade level
4. **Advanced:** The student performs beyond grade level

The more detailed definitions used by NAEP officials are given in a glossary on the Standard & Poor's SchoolMatters website.[i]

Given the definitions, there are two passing grades: Proficient and Advanced.

Most states also use these four labels to indicate student skills. However, it is well known from comparing the scores at the statewide level that the state exams "pass" higher fractions of the students than is the case for the NAEP- and sometimes more than double the number. Resolving this discrepancy is the primary goal of this report. In what follows, we shall use the term "proficient" to mean proficient or better- thus including those who score in the Advanced range.

Relationship to social promotion

We define social promotion as the practice of promoting children who are not proficient in a grade level. This means the promotion of children who would be in the categories of Basic and Below Basic on the NAEP test or a similar achievement test administered by the state or district officials. We advisedly use the word "similar" because nearly every state within the U.S. does not use achievement tests consistent with the NAEP. Rather the states use tests that produce inflated numbers of children designated proficient or better. Because of the consequent misrepresentation of the tests' proficiency numbers it becomes difficult to determine how many students are realistically proficient against a benchmark such as the NAEP.

Missouri is the only state that had not inflated these scores in the past, but has recently abandoned that practice- probably in an effort to make their public education systems appear better than they really are. Countering that example is Massachusetts where the inflation has been brought down significantly- averages only 4% in our latest review of the data. After ranking the nearly 50 states for which test results are available, we find that the median state inflates its test proficiencies about 100%.

To raise proficiency levels there are two things educators can do even before considering instructional reforms. They should:

1. Use testing regimes consistent with the NAEP.

2. Use retention and/or other means aggressively so as to place each child appropriately.

If schools would apply these two policies, the numbers of students deemed proficient would approach 100% by virtue of the fact that most of the sub-par students would have been removed from each instructional level. Surely, no policy implementation is going to be perfect, but we would expect proficiency percentages to significantly exceed 90% in every school managed this way.

Unfortunately, such policies are rarely followed. And in district after district the fact that very large majorities of the students fail to achieve Proficiency (as defined by the NAEP) is a clear indication of Pennsylvania's (unwritten) policies of social promotion.

Finding that state standards are lax compared to NAEP's

The Standard & Poor's organization has established the website www.schoolmatters.com where one can find considerable information about achievement test scores in the American public education sector. Of particular prominence in their data archives are the results of state administered achievement tests as well as the federal NAEP test results. Generally, the state administered results are available for individual schools and for districts as well as statewide. In comparison, the NAEP results are only available statewide and nationwide.[♣] In what follows we discuss some details about the achievement tests in Pennsylvania and in some other relevant states.

Pennsylvania's achievement test results (Pennsylvania System of School Assessment – PSSA) were obtained from the Pennsylvania Department of Education website.[ii] Though available at the SchoolMatters website, most of our NAEP data has been taken from NAEP's website.[iii] Also, from the Pennsylvania area of the SchoolMatters.com website, you can see that the local state criteria for proficiency are markedly lower than those of the NAEP.

To give this some perspective we show in Table 1 some information about achievement test inflation in the selected states of Massachusetts, Mississippi, Ohio, New York, as well as Pennsylvania. The proficiencies shown are the average of 4th grade and 8th grade results. It also shows the inflation factor by which these states "augment" their testing results.

Table 1. Showing how K-8 state reported proficiency percentages are inflated by comparing against the defacto national standard: The NAEP benchmark.

State	State determined proficiency percentage in reading	NAEP determined proficiency percentage in reading	Inflation factor for reading	State determined proficiency percentage in math	NAEP determined proficiency percentage in math	Inflation factor for math	Average inflation factor
MS	71.5%	18.0%	3.97	70.5%	17.5%	4.03	4.00
OH	77.0%	36.0%	2.14	72.8%	40.5%	1.80	1.97
PA	72.6%	38.0%	1.91	73.0%	42.5%	1.72	1.82
NY	59.0%	34.0%	1.74	66.0%	36.5%	1.81	1.78
MA	62.0%	46.0%	1.35	40.0%	54.5%	.73	1.04
USA	NA	29.5%	NA	NA	31.5%	NA	NA

The table is ordered by the average inflation factor (last column) with the nation's most flagrant inflator, Mississippi shown first and its least flagrant, Massachusetts, shown last. Additionally, the neighboring states of New York and Ohio are shown together with the results for Pennsylvania.

It is worthy of comment that the ordering is approximately that of the NAEP scores, with only New York being out of order. This suggests that states with the more modest achievement test proficiencies (on the NAEP) may be covering their embarrassment by using large amounts of inflation to deceive their stakeholders.

[♣] The reason for this restriction relates to the fact that the NAEP tests are administered to sparsely located samples of students. The statistical sampling is very reliable to produce statewide and national results, but would be unreliable for any smaller subdivisions such as school districts or individual schools. A further restriction applies to the 12th grade test where the results are reported only for the nationwide sample.

Where Pennsylvania falls in the inflation spectrum

A U.S. Department of Education report[iv] shows that Pennsylvania, with its 82% inflation, falls just below the median of the states when they are ranked according to inflation. Pennsylvania's reported proficiencies, which are nearly double those of NAEP, apparently give less concern to stakeholders in Pennsylvania's public schools than if more accurate and honest results had been provided. In some cases where the proficiencies reported by the PSSA are in the 80% and 90% ranges they are a matter of mistaken pride when the actual NAEP scale proficiencies, now in the 50% and 60% ranges, are troubling.

Manipulating the testing environment to control inflation

One way to understand the inconsistent proficiency levels is to recognize the interplay between content standards and cut-scores when determining which students should be accorded the status of proficient. Assuming that the tests used by the states reliably measure mastery of their content standards, there are at least two ways to artificially raise proficiency percentages above those obtained from the NAEP tests. They are:

- Lowering the cut scores
- Reducing the content standards, thus making the tests easier

Ideally, by adjusting these cut scores and content standards up or down, each state should be able to align its proficiency percentages to those reported by the NAEP. However, since states tend to allow other considerations (including political factors) to influence the cut scores and content standards, it is not surprising to find large discrepancies and ones that in almost every case significantly inflate student performance. It is not likely that these discrepancies are due to technical difficulties in the administration of the tests for if they were one would expect the state tests to sometimes report lower proficiencies than found on the NAEP. It is more likely that test administrators designed their testing regimes to provide results that make their public school systems look much better than they really are! Thus we believe that the inflation is there primarily by design and is generally not the result of inadvertent errors.

Relationship to NCLB concepts and requirements

Under the *No Child Left Behind* (NCLB) legislation, states are expected to maintain what is called, *Adequate Yearly Progress* (AYP), in each public school. Each year the requirements are increased until 2014 when every public school student will be expected to score proficiently on the state's achievement tests.

This seemingly rigorous requirement is really quite lax because states are free to set their own standards for proficiency. We already mentioned the example of Missouri, which recently relaxed its achievement test standards in a questionable attempt to raise their proficiencies. And as we have already noted, Pennsylvania's count of proficient students is about 80% above the NAEP benchmark. Under NCLB, states are free to weaken their standards. By moving the bar low enough, all students can be made to appear proficient by year 2014.

By using tests consistent with (aligned with) the NAEP or by removing the inflation from the state reported proficiencies, states can then report meaningful proficiency percentages. Typically, these numbers are low. Stakeholders can respond by employing various remedial measures. We think the ending of social promotion is key to improving proficiencies if there is to be any hope of legitimately meeting the NCLB goal of 100% proficiency by 2014.

Relevance of Massachusetts's deflation of K-8 math proficiencies?

One thing that is odd about the results in Table 1 is the apparent 27% "deflation" in the Massachusetts's mathematics scores. Specifically, the deflation is largest in 4th grade at 31%, less so in 8th grade at 22%, and finally (not shown in the table) is followed by a large 61% dose of inflation in 10th grade- and is done in such a way that averaged over the three testing levels one finds a small net inflationary effect. It takes what in actuality are declining mathematics proficiencies as students move from primary school through high school and produces the illusion that the children are improving as they move up through the grade levels. It is not clear whether this "differential inflation" was intentional

or inadvertent. While this is not an issue in Pennsylvania, we believe that stakeholders should be aware of this other technique that can be used to mislead.

Estimating Legitimate Proficiencies at the Local Level

We know that the NAEP results are based on a standard that has been legitimized over time- it's essentially a national benchmark. But they are only available at the statewide and national levels. On the other hand, the state administered tests are available at district and school levels as well as statewide, but suffer from the inflated results. We now describe a method for estimating what the district and local test results would have been on the more realistic NAEP scale.

The details of achievement testing methodologies are complicated and rely on sophisticated statistical techniques. The estimation procedure given below is based on some assumptions that don't require knowledge of the testing details.

The two important data items, in each case, are the two conflicting statewide proficiency percentages, first, as reported by the state's own achievement tests and, second, as reported by the NAEP. This discrepancy gives one a measure of the degree to which the statewide scores have been inflated, but doesn't provide the inflation factors more locally- at the district and school levels. Our goal here is to fill that gap and convert state reported proficiency percentages for districts and schools into more realistic proficiency percentages that are consistent with the NAEP results.

By making a few assumptions we can derive a formula to estimate what the NAEP results would have been obtained in any given district or school. We do this by applying a correction "algorithm" to the inflated state reported results. The assumptions we make are:

1. We first imagine that all students taking the state achievement exams also took the NAEP and that the NAEP results for this full sample are the same as those reported from the actual NAEP examination (that was administered to a smaller sample). This is correct to within the so-called sampling error that is generally on the order of two percentage points on the proficiency scale for the NAEP examinations. This assumption means that there is a one-to-one correspondence between the two groups of examination "subjects," which is an essential property of a mathematical map.

2. We next assume that the two exams, those of the state and the NAEP, are similar in regard to the order of examination scores among the students. (This means the student scoring n^{th} from the top on the NAEP would also rank n^{th} on the state examination.) This means that the map will be well ordered in the sense that any subset of students that scores relatively lower to a subset that scores higher on the one exam will always score lower than the higher group on the other exam. This means that our map will be monotone increasing.

3. We introduce the variables *S* and *R*. *S* is the percentage or fraction of students within a tested group who are designated as proficient on the state's exam. The tested group could be that of a school, of a district, of a tested demographic group, or of the total statewide tested population. *R* is the percentage or fraction of them that would be proficient on the NAEP. Since *S* is known, our goal is to estimate *R* if we are given *S*. Thus we are seeking to build a map relating *S* to *R*. In functional terms we seek to find $R = R(S)$. Since *R* and *S* are percentages, they each run over the range 0% to 100%. Because of the monotone assumption, just described above, $R(S)$ is also a monotone increasing function.

4. We already know one pair, call them *So* and *Ro*. They are the proficiency percentages from the statewide assessments done by the state and the NAEP, respectively. The two other pairs result from the mathematical requirement that $R=0$ when $S=0$ and that S=1 when R=1 (S = 100% when R = 100%).

5. In our simulated examination environments, we have noticed a symmetry property that seems to hold for $R = R(S)$ in most of the cases we have studied. Let's specify the functional form at $R(S) = f(S)$. The symmetry property is $(1-S(R)) = f(1-R)$. Geometrically, this means that the curve $R(S)$ is symmetric about the unit square descending diagonal line running from (0,1) to (1,0). We have also observed in the simulated examination

environment that the slope of *R(S)* becomes very large at *S* = 1 tending towards infinity. We'd also want our interpolation to possess this "singular" property.

Constructing the Mapping Formula

We have developed a formula satisfying the five assumptions which has just the right number of undetermined parameters to match the one known data pair (*So, Ro*) and the boundary condition *R*(1) = 1. It is:

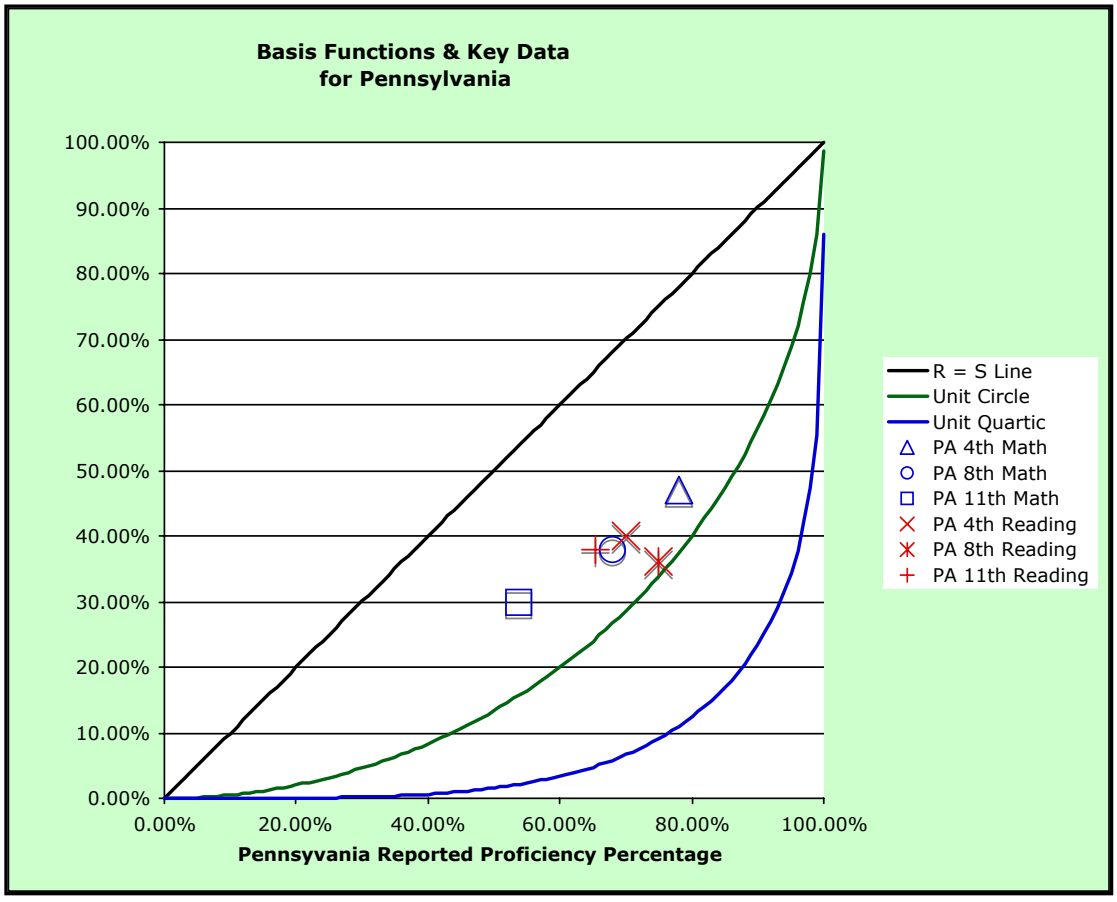
$$R(S) = \alpha S + \beta\left[1 - \sqrt{1 - S^2}\ \right] + \phi\left[1 - \sqrt[4]{1 - S^4}\ \right] \qquad \text{Eq. 1}$$

Each of the three terms has a geometric significance: They are the equations of a straight line, a circle, and an equilateral quartic. We use only the first two terms when (*So, Ro*) lies at or above the circle

$$R_C(S) = \left[1 - \sqrt{1 - S^2}\ \right]$$

and we use only the last two terms if (*So, Ro*) is below the circle. In Pennsylvania all the (*So, Ro*) values lie above the circle and thus we only use the first two terms. As can be directly proven, the first two terms taken together are the equation of an ellipse. Geometrically, the interpolation technique is that of drawing an ellipse running from the origin *R*(0) = 0, then through the data point (*So, Ro*) and also through the boundary point *R*(1) = 1 where it is tangent to the vertical. In the figure below we show how all of the actual data points from Pennsylvania lie inside the circle. It also displays the curves representing the three terms or basis functions from Eq. 1.

Figure 1. The basis functions for the ELQ interpolation formula are displayed together with the 6 different (*So*, *Ro*) pairs of NAEP data for Pennsylvania. In each case here the interpolation curve will be a weighted average of the circle and the straight line; geometrically each is an ellipse. The quartic curve is used only when data lies below the circle.



We developed a number of different interpolation formulas prior to the development of the ELQ formula. Many of them were quirky combinations of linear, quadratic and even parabolic approximations. Only the one of them represented the singularity properly but it didn't match the symmetry condition well. Our ellipse-quartic (ELQ) method is consistent with all five assumptions given above. In tests against simulated examination environments, it has been measured to have the lowest errors in fitting the proficiency percentages of any of the other interpolation formulas tested.

As we shall demonstrate below, we have been able to measure the errors of our predictions in six other cases in which NAEP scores are known. NAEP not only provides proficiency percentages for statewide samples of all public school students in 4th and 8th grades, it also provides these numbers in Pennsylvania for six different demographic subsets: females, males, whites, blacks, Hispanics, and Asians combined with Pacific Islanders (hereafter denoted as Asians). Since Pennsylvania also reports proficiency percentages for these groups, for each such S value we can compare the actual R-value against the one predicted from the mapping formula. Fortunately, when we do that we find errors generally of the same magnitude as the sampling errors of the NAEP examinations. As will be discussed later, 11th grade Asian reading scores are a notable exception to this rule.

In a separate report we have provided considerable detail about the derivation of the ELQ interpolation formula and of its predecessors. That report, *Mapping State Reported Proficiency Percentages to the NAEP Scale,* is available on the AsoraEducation.Com website.[v]

Lacking actual detailed testing data led us to create a simulated examination environment within which we created replicas of a tough exam- think of it as a NAEP proxy- and easy exams to represent the state administered ones. In that simulated environment we assumed that within any tested group that the examination scores were distributed according to the normal distribution of statistics theory. Various plausible assumptions about standard deviations and about methods for inflating proficiency percentages were analyzed. Though not always precise in every case, for a wide range of seemingly realistic models, the relationship found between the modeled state proficiency percentages S with the modeled NAEP percentages R were quite consistent with the five assumptions discussed above.

Also "falling out" of that analysis was the ellipse curve, which in most instances fit the numerically calculated *R(S)* relationship quite well.

In the next sections we show graphs of the actual interpolation curves used in analyzing Pennsylvania's reported proficiency percentages. Specifically we study grade levels 4, 8, and 11, which are among the ones tested in Pennsylvania.

In terms of the mathematics, all of the curves in Figs. 2 - 4 below are precisely ellipses. (Any wiggles that seem to belie our claim of precision are due to the smoothing procedures used by MS Excel's graphics software and in any case are not real).

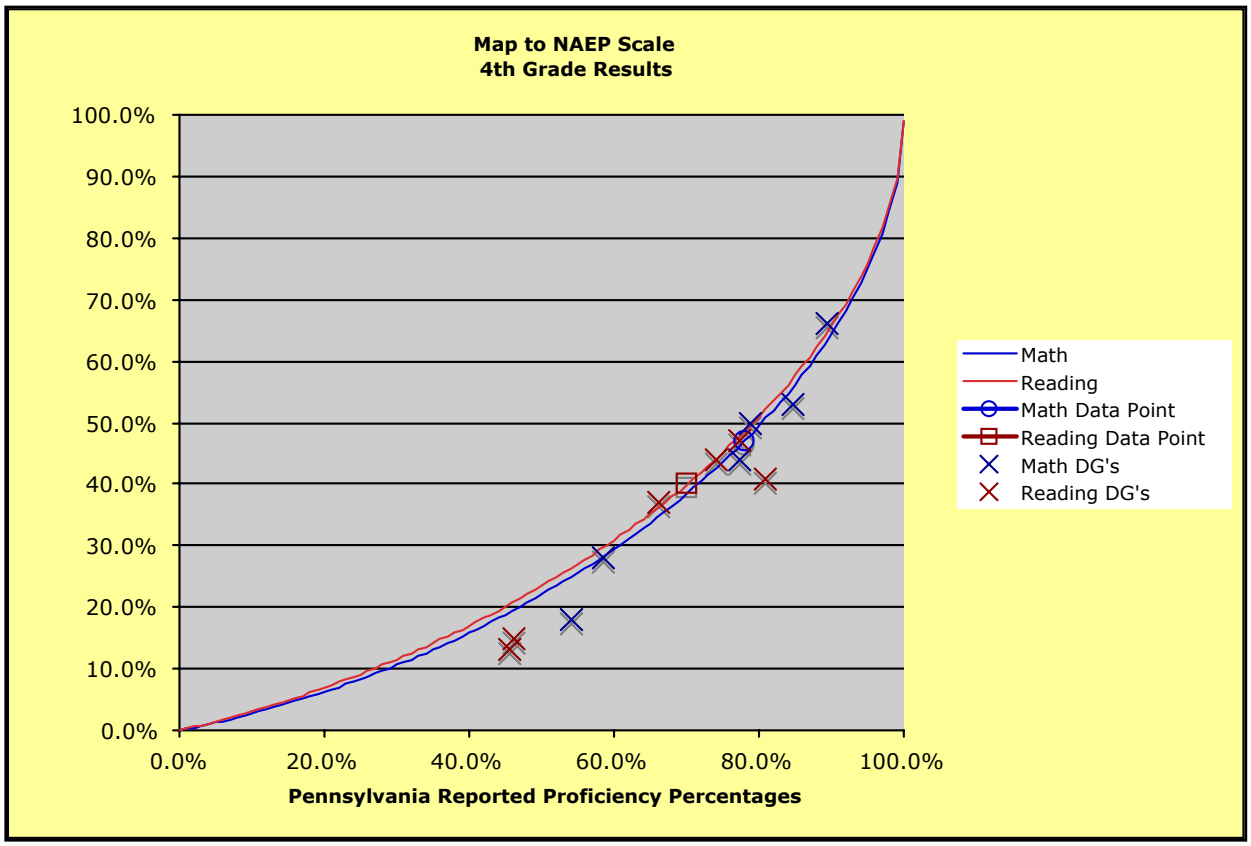
The Maps for 4th Grade, 8th Grade, and High School

To make plausible our mapping estimation procedure, in the next few sections we show the various graphical representations of the interpolation curves actually used with respect to the 4th, 8th, and 11th grade assessment regimes in Pennsylvania.

The 4th grade maps

We begin by displaying the 4th grade interpolation or mapping functions. The notation "DG" on the figures refers to "demographic group."

Figure 2. Map for Pennsylvania's 4th grade public school students shows the interpolation curves for both mathematics and reading. The data for demographic groups are shown by the X symbols. Their vertical displacements from the curves are measures of the errors in this analysis. At the 4th and 8th grade levels, the ELQ mapping generally has errors smaller than 5% in terms of proficiency percentages.



The curves for Pennsylvania 4th grade students were generated by the requirement that they each pass through the data points here shown by the circle and square icons for math and reading, respectively. Those data points are taken from the statewide proficiency percentages reported from Pennsylvania's tests (the horizontal coordinate) and from the NAEP tests (the vertical coordinate).

Measured errors and sampling errors

We check the accuracy of the ELQ mapping formulas by showing the actual (S, R) pairs for the six demographic groups, which are also tested by NAEP in each state. They are denoted by the X marks shown on the graphs. By measuring the vertical distance between the X positions and the corresponding curve we find the measured errors with respect to the prediction of the mapping formula for each of the six demographic groups. The NAEP organization also publishes the "standard errors" associated with each of these data pairs, which are due to the effects of sampling methodologies. What we observe for the 4th grade testing in Pennsylvania is that the measured errors average about a factor of 1.4 larger than the corresponding sampling errors. There is a kind of compounding effect wherein the combination of the two types of errors increases the overall level of errors in the analysis.[♥] For the numbers developed in our study of Pennsylvania public schools the errors thus accumulated are still small enough to not invalidate the general conclusions evident in our results.

[♥] One cannot simply add the average errors of the two types to obtain the combined effect. It is more correct to add the squares of the errors to obtain the square of the combined average errors. This means that the combined average error will be the square root of the average square error. For the simplest case in which the two average errors are roughly the same the combined error is not double but rather goes up by the square root of two or by about 41%.

In Pennsylvania the sampling errors (of the NAEP proficiency percentages) for the demographic groups are generally in the range of 1% to 3% except the Hispanic and Asian sub-groups have sampling errors between 5% and 8%. So, for example, in Figure 2 the red X farthest below the red curve denotes the Asian sub-group's result and obviously has the largest measured error. However, compared to its sampling error it's of the same order (about 1.8 times larger). This is to suggest that viewing an X significantly displaced from its curve should not cause alarm if its associated sampling error is of a similar magnitude.

Even without thinking about the details of an error analysis, most of the X marks in Figure 2 are visually close to the curves. Thus it appears that our interpolation functions or mapping functions may be reasonably accurate in predicting what different testing groups would have achieved on the NAEP once we know their scores on the state administered tests.

A significant dose of inflation in Pennsylvania

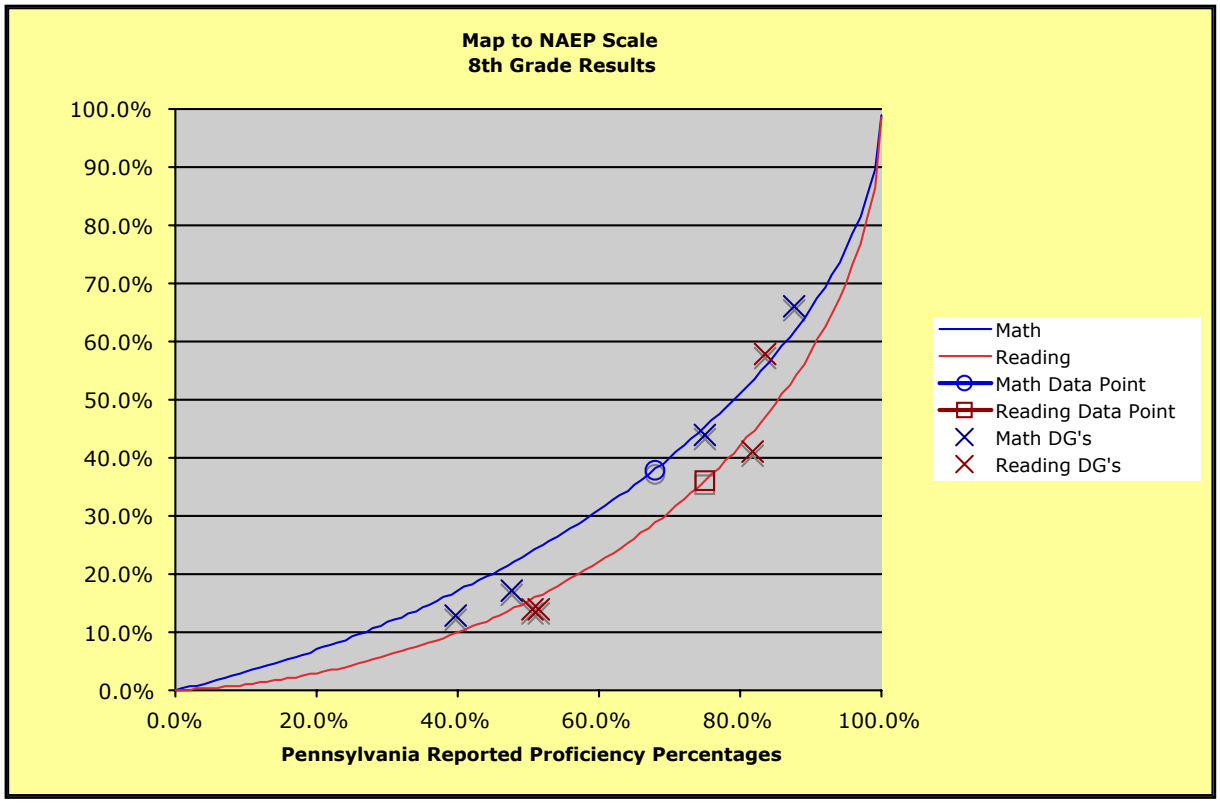
Figure 2 displays mapping curves that are quite concave, which is an indication of significant inflation. Curves that would correspond to little or no inflation would lie near or on the straight $R = S$ line. But as we see in Figure 2. the R values, midrange, are only about half of the S values. As can be seen by measuring off the graph (where the square or circle icons sit) or by reference to the accompanying Excel spreadsheet, the statewide inflation in 4th grade for mathematics is 66% while that for reading is 75%. Reporting results that embed (and effectively hide) these levels of inflation, as is done by the PSSA, can result in more tolerance for the status quo than is warranted.

The fact that the two mapping curves are almost identical suggests that the "dosage" of inflation may have been planned. Otherwise it is improbable, though not impossible, that these curves would so closely overlap.

The 8th grade maps

As is evident below, the Pennsylvania maps in 8th grade are qualitatively similar to the ones we showed for 4th grade except here they do not overlap. We see that by 8th grade the mathematics inflation has increased to 79% and that of reading to 108%.

Figure 3. Map for Pennsylvania's 8th grade public school students shows the interpolation curves for both mathematics and reading. The data for demographic groups are shown by the X symbols. Their vertical displacements from the curves are measures of the errors in this analysis. At the 4th and 8th grade levels, the ELQ mapping generally has errors smaller than 5% in terms of proficiency percentages.



What we do find remarkable about Figure 3. is the visual evidence of the accuracy of the ELQ interpolation method. Here the measured errors very closely averaged out to equal the sampling errors reported by NAEP.

The high school maps require additional approximations

Less information is available from NAEP about high school proficiencies thus making it more difficult to predict what high school children would have achieved had they taken a NAEP consistent examination in the 11th grade. You may recall that the NAEP examinations in the 12th grade only provides nationwide results. Some way must be found to generate approximate statewide NAEP proficiencies if we are to use them to estimate high school level inflation and provide school/district level NAEP estimates of student proficiencies.

Since the Pennsylvania PSSA tests measure 11th grade performance, we would like to know how students would have performed on an imagined 11th grade NAEP. This suggests the two-step process that we employ:

- Find approximate statewide NAEP scale proficiency percentages at the 12th grade level.
- Interpolate between that value and the known 8th grade NAEP proficiencies to obtain the 11th grade number.

Approximating 12th grade NAEP proficiencies

We now consider how one might obtain a reasonable approximation of what Pennsylvania 12th grade public school students would have achieved statewide on the NAEP. Different approaches have been considered:

1. Extrapolate the 4th and 8th grade Pennsylvania NAEP results linearly to provide a 12th grade number.
2. Apply the scaling factor measured nationally that relates 12th grade NAEP results to those at the 8th grade and then use this proportionality factor in each subject area to generate a Pennsylvania 12th grade proficiency percentage from its NAEP measured 8th grade proficiency.
3. Analyze the national relationships of the 4th, 8th, and 12th grade NAEP proficiencies for the several different demographic groups to determine a formal linear relationship between the 12th grade proficiencies and those at the 4th and 8th grades. Then apply this same linear relationship to the Pennsylvania 4th and 8th grade NAEP scores to provide an approximation of the 12th grade scores. Refine this approximation by using the nationally determined errors for each demographic group to provide a correction increment to be added to the linear approximation.

To get an idea of how these methods compare, we look at their predictions for national proficiencies as shown in the following tables.

Table 2. Applying the three methods to the nationwide NAEP scores of 4th and 8th grade students produces these estimates for 12th grade mathematics and reading proficiencies.

The actual 12th grade scores are known so this provides a means to compare the three optional methods. The least squares method is clearly superior with its smaller errors.

What The Various Methods Predict Nationwide Versus The Actual Measurements of Mathematics Proficiencies								Sum of
Method	White	Black	Hispanic	Asian Etc.	Female	Male	All	Squares Error
Simple Extrapolation	30.0%	6.0%	7.0%	38.0%	21.0%	24.0%	22.0%	0.27%
Scaling	29.1%	7.8%	10.6%	34.8%	20.6%	23.4%	22.0%	0.25%
Least Squares	27.7%	5.8%	7.5%	34.4%	19.3%	22.1%	20.4%	0.07%
Actual USA	28.0%	5.0%	7.0%	33.0%	20.0%	24.0%	22.0%	0.00%
Maximum Error	2.0%	2.8%	3.6%	5.0%	1.0%	1.9%	1.6%	
What The Various Methods Predict Nationwide Versus The Actual Measurements of Reading Proficiencies								Sum of
Method	White	Black	Hispanic	Asian Etc.	Female	Male	All	Squares Error
Simple Extrapolation	42.0%	18.0%	19.0%	43.0%	41.0%	27.0%	34.0%	0.75%
Scaling	44.6%	14.1%	16.4%	46.9%	39.9%	28.1%	34.0%	1.46%
Least Squares	37.5%	17.5%	17.8%	37.8%	38.3%	23.7%	31.0%	0.28%
Actual USA	41.0%	15.0%	18.0%	35.0%	40.0%	27.0%	34.0%	0.00%
Maximum Error	3.6%	3.0%	1.6%	11.9%	1.7%	3.3%	3.0%	

As the table shows, judged by the sum of the squared errors, the least squares method is superior to the others in its ability to predict national scores. We assume this advantage carries over to statewide NAEP scores. When we apply the three methods to Pennsylvania's statewide data we find a range of results as shown in the next table.

Table 3. Applying the three methods to the statewide Pennsylvania NAEP scores of 4th and 8th grade students produces these estimates for 12th grade mathematics and reading proficiencies. Here the actual 12th grade scores don't exist so this provides a rough measure of the disparity of the results, which we take to be a measure of a range of errors.

What The Various Methods Predict Statewide for Mathematics Proficiencies, Showing Their Ranges of Values							
Method	White	Black	Hispanic	Asian Etc.	Female	Male	All
Simple Extrapolation	34.0%	7.0%	5.0%	65.0%	25.0%	33.0%	28.0%
Scaling	31.2%	9.2%	12.1%	46.8%	24.8%	29.8%	27.0%
Least Squares	31.1%	6.1%	6.5%	52.8%	23.9%	31.6%	27.3%
Maximum Value	34.0%	9.2%	12.1%	65.0%	25.0%	33.0%	28.0%
Minimum Value	31.1%	6.1%	5.0%	46.8%	23.9%	29.8%	27.0%
Error Range	2.9%	3.1%	7.1%	18.2%	1.1%	3.2%	1.0%
What The Various Methods Predict Statewide for Reading Proficiencies, Showing Their Ranges of Values							
Method	White	Black	Hispanic	Asian Etc.	Female	Male	All
Simple Extrapolation	43.0%	23.0%	21.0%	83.0%	44.0%	37.0%	40.0%
Scaling	48.1%	16.4%	16.4%	68.0%	46.9%	38.7%	42.2%
Least Squares	40.8%	21.1%	20.9%	82.5%	41.0%	36.4%	38.7%
Maximum Value	48.1%	23.0%	21.0%	83.0%	46.9%	38.7%	42.2%
Minimum Value	40.8%	16.4%	16.4%	68.0%	41.0%	36.4%	38.7%
Error Range	7.3%	6.6%	4.6%	15.0%	5.9%	2.3%	3.5%

In considering the statewide predictions of these three methods, the least reliable is that for the Asian students where the ranges of predicted proficiencies are close to 18%. Since at the high school level it is most often the relatively lower mathematics proficiencies that limit and determine the combined proficiencies (reading and math) we think the ranges of values shown for mathematics, being smaller, suggest that the predictions may be valid within about 10% except for the Asian group.

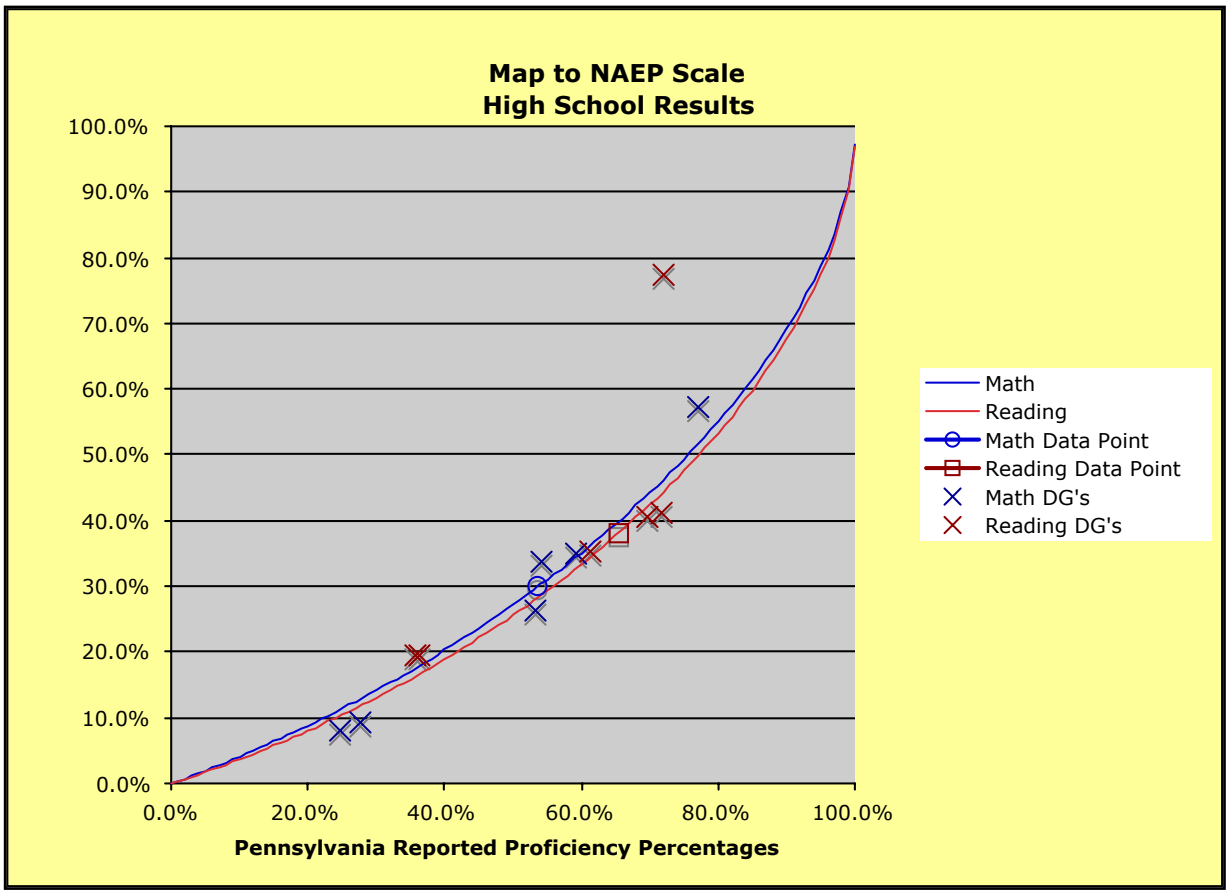
Interpolating to generate a NAEP scale 11th grade proficiency

Having produced the 12th grade "proxies" for statewide NAEP proficiencies in both mathematics and reading, we now linearly interpolate between them and the known 8th NAEP proficiencies to obtain an approximate NAEP scale pair of proficiencies at the 11th grade. This will enable a direct comparison with the Pennsylvania PSSA 11th grade achievement test proficiencies.

One small benefit of this interpolation is that it reduces the larger errors inherent in our 12th grade approximations by about one-fourth. With approximate NAEP scale proficiencies now calculated for the 11th grade, we have the information to generate the mapping curves, which are shown next in Figure 4.

The 11th grade maps

Figure 4. The map for Pennsylvania 11th grade NAEP proficiency percentages is the result of three approximations. The first extrapolates, by means of a least square error analysis, 4th and 8th grade NAEP proficiencies to obtain a 12th grade approximate value. Then linear interpolation is used to obtain the 11th grade value, shown here as a circle or a square, that was used in constructing this map. Finally, the other points on the curves are determined using the ELQ interpolation formulas.



Unlike the situation for our analysis at the 4th and 8th grade levels, our approximations and estimates for the 11th grade level should be considered as presumptive rather than determinative. With this caveat in mind, we will see where our assumptions take us.

Source and mitigation of the large Asian reading proficiency gap

In Figure 4, the most troubling aspect is the red X that is well above the mapping curve- in fact, 31.9% above it. The vertical position of that red X represents our 11th grade NAEP approximation of what the statewide Asian reading score would have been among Pennsylvania public high school students. We have done numerical experiments with the input data of that approximation to determine the origins of this large gap. We have identified this large increment to be composed of a discrepancy resulting from demographic characterizations and of a sampling error inherent in the NAEP reported proficiencies.

- **The discrepancy:** Considering the Asian demographics we note the peculiar fact that between 4th and 8th grades the nationwide Asian NAEP reading scores declined 5% while in Pennsylvania they went up 17%. To gauge the effect of this discrepancy we tested our model by temporarily changing the 4th grade Pennsylvania NAEP reading score input data to force a similar 5% decline in the state NAEP reading scores. The result was a large reduction of the measured discrepancy down to 5.7%.

- **The sampling error effect:** NAEP reports fairly large sampling errors for Asians on NAEP's Pennsylvania statewide tests (6.3% and 7.4%, for reading in 4th and 8th grades, respectively). Since the 11th grade NAEP approximation depends on a linear combination of those two proficiencies, those errors can carry over. To see the effect of this numerically we found that by temporarily adjusting the state reading NAEP proficiency for 8th grade downward from 58% by 3% to 55% we could further lower the gap from 5.7% down to an almost negligible 0.3%. This 3% decrement in the 8th grade proficiency is clearly allowable as it is well within the bounds of its NAEP reported 7.4% sampling error.

This experimentation with the data clearly shows the likely origins of the large observed error/discrepancy of 31.9%. However, given the requirement that we maintain the integrity of our input data, we cannot simply adjust the data to make the measured errors go away. Rather we must adapt to the reported numbers.

To seek a partial explanation for the demographic mismatch between Asian NAEP reading proficiencies nationally versus those within the state, we reviewed U.S. Census Bureau statistics. Pennsylvania differs significantly in the "sub-ethnic" makeup of its Asian population from the proportions reported nationally.[vi] We find that the population with national derivation from the Indian subcontinent makes up a significantly higher fraction within Pennsylvania than within the country as a whole (26% as compared to 17%). Those of Indian extraction tend to perform much better in school than the average Asian as suggested by the percentages of these students who go on to receive college degrees (64% versus 44%). Whatever the ethnic factors are, the Asian students within Pennsylvania are becoming more proficient in reading as they mature in contrast to their nationwide cohorts who decline in reading proficiency as they get older.

How do these errors and discrepancies affect our analysis? Given the Asians small 3% fraction of the tested population, we believe the effects will be acceptably small- except possibly in schools with a large Asian enrollment. We are less concerned about the other demographic groups, where we observe considerably smaller errors and discrepancies of the types just enumerated.

The lesson we learn from the "sky high" red X is not that our ELQ mapping formula is significantly flawed. Rather the problem is more likely using the label Asian to denote one ethnic mix nationally and another statewide. It would be interesting to re-do the analysis for the Chinese, Indian, Vietnamese, and other subgroups separately to see if their X positions would conform better to the ELQ curves.

For the other demographic groups, (blacks, Hispanics, whites, females and males), where we presume the nationwide and statewide socio-economic factors are more similar, the close proximity to the mapping curves of most of the X values derived from the demographic results suggests that the method is generally applicable.

So we ask to what extent this problem with Asian reading proficiencies invalidates our reported results? On the statewide level, it is clear that the Asian reading proficiency one reads off the ELQ curve is too inaccurate to be useful. At the school and district levels, we do not study the Asian proficiencies so there would appear to be no major difficulty. There could be a problem in schools where the Asian enrollment is a major fraction of the school's population. In such cases the reading proficiencies would not be reliable. However, in much of our analysis we are interested in the combined proficiencies in mathematics and reading. Since these are taken to be the minimum proficiency between mathematics and reading and since the mathematics proficiency is the lower of the two among Asian high school students at the high school level, the large errors in Asian's reading proficiencies will not likely affect the final result.

Not mentioned yet are the Asian mathematics proficiencies. Fortunately, they conform much more closely to the mathematics ELQ mapping curve. Referring to Figure 4. we see that the blue X furthest to the right (the Asian one) is much closer to the mapping curve than its red counterpart thus representing a smaller error of less concern. In fact, we find that the 4.4% error or displacement of the blue X from the mapping curve is less than the corresponding NAEP measured sampling error of 7.4%.

Thus we conclude that despite the problems seen here in the analysis of the Asian demographic group's reading proficiencies, those problems do not appear to invalidate the results we generate here for the combined reading and mathematics proficiencies either locally or statewide.

About the foregoing maps

In all of the three preceding figures, corresponding to the three grade levels of interest, it is reassuring to see the interpolation or mapping curves go through the data points that established them. The curves also satisfy the other boundary conditions that were stipulated in the assumptions. Thus the interpolation maps meet the set requirements.

While the foregoing graphical representations of our mapping formulas are qualitatively similar, they obviously differ in details. For example, they all show an increased slope of the lines as the S value approaches 100%. These graphs show smooth (and continuously differentiable) curves that are consistent with the mathematical requirements that we placed on the mapping formulas. This is a significant improvement over some earlier versions of our analysis where "kinks" in the interpolation curves were quite evident. Finally, for the Pennsylvania data there was no use of the quartic term in the approximation. This means that every one of the interpolation curves is an ellipse passing through the data pair (*So, Ro*) and otherwise meeting the appropriate boundary conditions.

The existence of NAEP scores for the six demographic groups allows us to check the accuracy of the mappings. As we earlier discussed, the demographic results provide us strong indications that the ELQ mapping method is indeed sufficiently accurate to allow us to predict proficiencies within about plus or minus 5% in grades 4 and 8. In high school at grade 11 we believe our estimates to be good to within 10%, except for the Asian demographic groups reading proficiencies. Since our estimates of local districts and schools do not separate the Asian sub-group, but are rather for the entire grade level tested population within a district or school we think the 10% claim to be reasonable.

Now, with the derived mapping formulas in hand, we can provide NAEP aligned estimates of the proficiency percentages either at the district or school level. In the next section we discuss 4th and 8th grade proficiency results for all public schools and districts in the state of Pennsylvania. Later, we also discuss the high school situation.

Results: NAEP Scale Estimates in Pennsylvania

Before presenting the results it is important to reiterate that they depend on a number of assumptions. We think that our assumptions, particularly the five listed near the beginning of this report, are valid- at least for the data pertaining to Pennsylvania. We also believe that the method will have wide application in other regions of the United States, but it remains to be seen to what extent this will be true.[♣]

The ELQ method obviously produces some level of error when it is applied but we believe these are small compared to the errors of inflation that it removes. Elsewhere we have demonstrated its advantages and small errors in the report[vii] that presents its derivation. Additionally, we have tested its accuracy against the known results of the six demographic groups. This gives us more confidence in the results that now follow.

Nevertheless, some of the results are shocking. They show extremely poor achievement in some schools, which will no doubt invite scrutiny about the validity of this method. Also the very best public schools in Pennsylvania are not as proficient as one would hope.

To the extent that the data we obtained from PSSA and NAEP have errors, our results will be erroneous. For example, there are some schools in the PSSA data tables that show 100% proficiency in both math and reading. One actually boasts 100.1% proficiency in both subjects! While the PSSA tests would likely show some schools with upwards of

[♣] It has been applied to Bristol County in Massachusetts, Ventura County in California, and to all schools and districts in Rhode Island.

90% being proficient (according to the state's definition) we find the number of schools accorded 100% proficiency to be quite unlikely. This bimodal distribution is quite improbable and is at odds with the probability distributions that typically characterize testing environments. One school was even reported to have 100.1% of its pupils proficient! Consequently, we believe there were some irregularities in the test administration that led to the reporting of too many fully proficient schools.

Our results generally show that highly regarded schools are often not nearly as good, in terms of proficiencies, as thought. This may also inspire complaints from those who believe them to be excellent schools. We welcome questions, comments, and advice that could help us correct and/or improve the methods used here and the results obtained from them.

Detailed results are presented in the accompanying spreadsheet.

The sheer volume of results precludes presenting them in the main body of this report. Instead we have presented them in a spreadsheet workbook, ***PA-NAEP-Estimates.xls***, accompanying this report.

The workbook consists of six worksheets as follows:

- **PA Districts 4&8 Alpha** presents the 4th and 8th grade results of the school districts in alphabetical order.
- **PA Districts 4&8 Ordered** presents the 4th and 8th grade results of the school districts in proficiency order.
- **PA Schools 4&8 Alpha** presents the 4th and 8th grade results of Pennsylvania schools in alphabetical order.
- **PA Schools 4&8 Ordered** presents the 4th and 8th grade results of Pennsylvania schools in proficiency order.
- **PA High Schools Alpha** presents the 11th grade results of high schools & districts in alphabetical order.
- **PA High Schools Ordered** presents the 11th grade results of high schools & districts in proficiency order.

To provide a glimpse of the information and formats found in the spreadsheets, we next display some small portions of three of them corresponding to the least proficient and most proficient schools in each of the three tested grade levels.

We now look, in the next two subsections, at four "snapshots" of the worksheet **PA Districts 4&8 Ordered.xls** that contains input data and the ELQ derived results.

Lowest and highest 4th grade results:

Table 4a. A small portion of the spreadsheet table of Pennsylvania 4th grade proficiency percentages is shown. Pink and blue back-grounded cells indicate input data and results from the application of the ELQ formulas, respectively.

					PP refers to proficiiency percentage		
Year of testing=	2007	2007	2007	2007			
School or Tested Group	State Test: 4th Math Proficiency Percentage	NAEP Test: Statewide 4th Math Proficiency Percentage	State Test: 4th Reading Proficiency Percentage	NAEP Test: Statewide 4th Reading Proficiency Percentage	NAEP Consistent ELQ 4th Math Inflation PP	NAEP Consistent ELQ 4th Reading Inflation PP	NAEP 4th Grade Consistent ELQ Proficient in Both
StateWide	78.0%	47.0%	70.1%	40.0%	47.0%	40.0%	40.0%
White Demographic Group	84.6%	53.0%	77.3%	47.0%	55.6%	47.7%	47.7%
Black Demographic Group	54.1%	18.0%	45.6%	13.0%	24.9%	20.5%	20.5%
Hispanic Demographic Group	58.5%	28.0%	46.1%	15.0%	28.2%	20.8%	20.8%
Asian Etc. Demographic Group	89.4%	66.0%	81.0%	41.0%	63.3%	52.2%	52.2%
Female	77.3%	44.0%	74.2%	44.0%	46.2%	44.2%	44.2%
Male	78.8%	50.0%	66.2%	37.0%	48.0%	36.3%	36.3%
HARTRANFT JOHN F SCH	24.6%	NA	5.7%	NA	8.2%	1.7%	1.7%
NEBINGER GEORGE W SCH	29.4%	NA	5.9%	NA	10.3%	1.7%	1.7%
POTTER-THOMAS SCH	22.4%	NA	6.9%	NA	7.2%	2.1%	2.1%
STEELE SCH	8.4%	NA	16.7%	NA	2.3%	5.6%	2.3%
DOUGLASS FREDERICK SCH	29.3%	NA	9.8%	NA	10.3%	3.0%	3.0%
ARSENAL EL SCHOOL	32.0%	NA	12.0%	NA	11.6%	3.8%	3.8%
IMANI EDUCATION CIRCLE CS	36.4%	NA	13.6%	NA	13.8%	4.4%	4.4%
MUNOZ-MARIN ELEM	32.2%	NA	14.4%	NA	11.7%	4.7%	4.7%
HAMILTON SCH	17.5%	NA	22.5%	NA	5.3%	8.0%	5.3%
CORNERSTONE CHRIST ACAD	23.5%	NA	16.7%	NA	7.7%	5.6%	5.6%
PHILADELPHIA MONTESSORI CS	19.0%	NA	33.3%	NA	5.9%	13.2%	5.9%
LINCOLN SCH	19.4%	NA	19.5%	NA	6.0%	6.7%	6.0%
WARING LAURA SCH	31.8%	NA	18.1%	NA	11.5%	6.1%	6.1%

Much of this table and the others to follow speak for themselves. In the top section we display statewide values where both Pennsylvania's PSSA results and the NAEP results are shown against the pink background and where derived quantities using the ELQ mapping are shown against the blue. The last column displays the minimum proficiency of the math and reading proficiencies shown in the two columns just to its left. It is a measure of a tested group's overall proficiency.

It also shows how the least proficient tested groups among 4th grade students, identified by their schools, are estimated to be performing. It is clear that very few children are being properly educated in these schools.

Next, in Table 4b, we show the bottom of the same spreadsheet table. There are two curiosities regarding this display. First, we note that there are several schools reporting 100% proficiencies (pink columns) but there are fewer in the percentiles within the 90%-100% range below them (also in the pink columns) suggesting some kind of irregularity. The other aspect seen at the very bottom of the table are schools that have an undefined proficiency which displays as #VALUE!. These are generally those schools for which the tested groups numbered fewer than ten students in which case the PSSA assigns the symbol * to indicate the proficiencies. The schools of this type are given no rank and their appearance at the high rank end of the table is simply the result of alphanumerical ordering. We keep them in the tables to allow interested parties to investigate them further.

Table 4b. A small portion of the bottom of the spreadsheet table of Pennsylvania 4th grade proficiency percentages is shown. The rows displayed are near the bottom of the table.

BRADFORD WOODS EL SC	100.0%	NA	97.4%	NA	100.0%	82.8%	82.8%
FORT WASHINGTON EL S	97.7%	NA	97.6%	NA	83.2%	83.5%	83.2%
ALLARD EL SCH	100.0%	NA	97.6%	NA	100.0%	83.5%	83.5%
UNIONVILLE EL SCH	98.9%	NA	97.8%	NA	88.4%	84.2%	84.2%
CROOKED BILLET EL SC	100.0%	NA	97.9%	NA	100.0%	84.6%	84.6%
BORLAND MANOR EL SCH	100.0%	NA	98.0%	NA	100.0%	85.0%	85.0%
WAVERLY SCH	98.4%	NA	100.0%	NA	86.0%	100.0%	86.0%
SOUTH ABINGTON SCH	100.0%	NA	100.0%	NA	100.0%	100.0%	100.0%
AD PRIMA CS	100.0%	NA	100.0%	NA	100.0%	100.0%	100.0%
FAIRVIEW EL SCH	100.0%	NA	100.0%	NA	100.0%	100.0%	100.0%
SEVENTH STREET EL SC	100.0%	NA	100.0%	NA	100.0%	100.0%	100.0%
INFINITY CS	100.0%	NA	100.0%	NA	100.0%	100.0%	100.0%
LABORATORY CHARTER SCH	100.0%	NA	100.0%	NA	100.0%	100.0%	100.0%
SPORTING HILL EL SCH	100.0%	NA	100.0%	NA	100.0%	100.0%	100.0%
LINCOLN EL SCH	100.0%	NA	100.0%	NA	100.0%	100.0%	100.0%
LINCOLN PARK EL SCH	100.0%	NA	100.0%	NA	100.0%	100.0%	100.0%
BLAIR COUNTY CHRISTIAN SCHOOL	#VALUE!	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!
BRADFORD AREA CHRST ACADEMY	#VALUE!	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!

Lowest and highest 8th grade results:

Analogous portions of the relevant 8th grade spreadsheet table are shown next.

Table 5a. A small portion of the spreadsheet table of Pennsylvania 8th grade proficiency percentages is shown. Pink and blue back-grounded cells indicate input data and results from the application of the ELQ formulas, respectively. We purposefully show more of this table as compared to Table 4a- both being cut off at proficiencies of 6.1%. The 8th grade table's much greater extent is indicative of the fact that 8th grade proficiencies are nearly always lower than the ones measured in 4th grade.

					PP refers to proficiiency percentage		
Year of testing=	2007	2007	2007	2007			
School or Tested Group	State Test: 8th Math Proficiency Percentage	NAEP Test: Statewide 8th Math Proficiency Percentage	State Test: 8th Reading Proficiency Percentage	NAEP Test: Statewide 8th Reading Proficiency Percentage	NAEP Consistent ELQ 8th Math Inflation PP	NAEP Consistent ELQ 8th Reading Inflation PP	NAEP Consistent ELQ 8th Proficient in Both
StateWide	67.9%	38.0%	75.0%	36.0%	38.0%	36.0%	36.0%
White Demographic Group	75.1%	44.0%	81.9%	41.0%	45.3%	44.7%	44.7%
Black Demographic Group	39.8%	13.0%	50.7%	14.0%	17.0%	15.7%	15.7%
Hispanic Demographic Group	47.7%	17.0%	51.4%	14.0%	21.9%	16.2%	16.2%
Asian Etc. Demographic Group	87.5%	66.0%	83.4%	58.0%	61.5%	46.8%	46.8%
Female	68.3%	35.0%	79.0%	40.0%	38.4%	40.8%	38.4%
Male	67.8%	42.0%	71.4%	33.0%	37.9%	32.1%	32.1%
LA ACADEMIA CS	0.0%	NA	20.0%	NA	0.0%	3.0%	0.0%
STETSON JOHN B MS	14.5%	NA	11.2%	NA	4.8%	1.2%	1.2%
DUCKREY TANNER SCH	4.5%	NA	28.0%	NA	1.3%	5.3%	1.3%
WETHERILL PREP ACADEMY COMM S	4.8%	NA	14.3%	NA	1.4%	1.7%	1.4%
VANN EL SCH	5.3%	NA	26.3%	NA	1.6%	4.7%	1.6%
PEIRCE WILLIAM S MS	5.5%	NA	17.8%	NA	1.6%	2.4%	1.6%
TRANSITION SCH	5.6%	NA	20.0%	NA	1.7%	3.0%	1.7%
HARTRANFT JOHN F SCH	22.9%	NA	16.3%	NA	8.2%	2.1%	2.1%
GECAC COMMUNITY CS	16.6%	NA	17.2%	NA	5.6%	2.3%	2.3%
DAROFF SAMUEL SCH	8.1%	NA	23.5%	NA	2.5%	3.9%	2.5%
CTR STUDENT LEARNING CS - PENN	8.3%	NA	50.0%	NA	2.5%	15.3%	2.5%
GILLESPIE ELIZ D MS	14.1%	NA	19.0%	NA	4.6%	2.7%	2.7%
RICHARD ALLEN PREP CS	9.0%	NA	36.3%	NA	2.8%	8.4%	2.8%
WEIL TECHNOLOGY INSTITUTE	17.1%	NA	19.5%	NA	5.8%	2.8%	2.8%
PROPEL CS-HOMESTEAD	9.5%	NA	28.5%	NA	3.0%	5.4%	3.0%
FITZSIMONS THOMAS ACADEMY	14.9%	NA	20.0%	NA	4.9%	3.0%	3.0%
ROWLAND SCHOOL	9.9%	NA	22.7%	NA	3.1%	3.7%	3.1%
DUQUESNE HS	45.4%	NA	20.6%	NA	20.4%	3.1%	3.1%
TUSCARORA BLENDED LEARNING CS	10.0%	NA	40.0%	NA	3.1%	10.0%	3.1%
LINCOLN SCH	15.3%	NA	20.7%	NA	5.1%	3.1%	3.1%
KELLEY WILLIAM D SCH	16.7%	NA	21.0%	NA	5.6%	3.2%	3.2%
STEELE SCH	12.5%	NA	21.2%	NA	4.0%	3.3%	3.3%
VILLAGE CS OF CHESTER-UPLAND	11.8%	NA	31.8%	NA	3.8%	6.6%	3.8%
WARING LAURA SCH	15.4%	NA	23.1%	NA	5.1%	3.8%	3.8%
DOUGLASS FREDERICK SCH	17.0%	NA	23.7%	NA	5.8%	3.9%	3.9%
ROONEY MIDDLE SCHL	21.1%	NA	24.5%	NA	7.5%	4.2%	4.2%
TILDEN WILLIAM T MS	27.0%	NA	24.7%	NA	10.1%	4.2%	4.2%
HAMILTON SCH	13.2%	NA	50.0%	NA	4.3%	15.3%	4.3%
ALCORN JAMES SCH	27.9%	NA	25.6%	NA	10.6%	4.5%	4.5%
GIDEON EDWARD SCH	14.3%	NA	42.1%	NA	4.7%	11.0%	4.7%
MUNOZ-MARIN ELEM	32.1%	NA	26.8%	NA	12.7%	4.9%	4.9%
MANCHESTER EL SCH	23.0%	NA	26.9%	NA	8.3%	4.9%	4.9%
HELEN S FAISON ARTS ACADEMY	20.5%	NA	27.2%	NA	7.2%	5.0%	5.0%
LUDLOW JAMES R SCH	39.4%	NA	27.3%	NA	16.7%	5.0%	5.0%
DOWNEY SCH	15.2%	NA	37.9%	NA	5.0%	9.0%	5.0%
RAISING HORIZONS QUEST CS	15.2%	NA	39.4%	NA	5.0%	9.7%	5.0%
HARRISON WILLIAM SCH	15.3%	NA	46.1%	NA	5.1%	13.1%	5.1%
MILLER AFRICAN-CENTERED ACADE	15.3%	NA	34.6%	NA	5.1%	7.7%	5.1%
WILKINSBURG MS	15.3%	NA	34.1%	NA	5.1%	7.5%	5.1%
DEBURGOS BILINGUAL	27.1%	NA	28.1%	NA	10.2%	5.3%	5.3%
ALIQUIPPA MS	16.9%	NA	41.5%	NA	5.7%	10.7%	5.7%
BENJAMIN FRANKLIN SCHOOL	24.3%	NA	29.7%	NA	8.9%	5.8%	5.8%
MARSHALL SCH	27.0%	NA	29.7%	NA	10.1%	5.8%	5.8%
PICKETT CLARENCE E MS	17.4%	NA	34.2%	NA	5.9%	7.5%	5.9%
POTTER-THOMAS SCH	17.7%	NA	30.9%	NA	6.0%	6.2%	6.0%
SMEDLEY MS	17.9%	NA	41.5%	NA	6.1%	10.7%	6.1%

In a similar fashion that we encountered in the previous section, we also display a portion from the bottom of the 8th grade proficiency table where the higher proficiencies are shown.

Table 5b. A small portion of the bottom of the spreadsheet table of Pennsylvania 8th grade proficiency percentages is shown. The rows displayed are near the bottom of the table.

CONNELL EL SCH	98.3%	NA	98.3%	NA	86.2%	82.5%	82.5%
MASTERMAN JULIA R SCH	98.5%	NA	99.0%	NA	87.1%	86.6%	86.6%
GIRARD ACAD MUSIC PROG	98.5%	NA	100.0%	NA	87.1%	100.0%	87.1%
LABORATORY CHARTER SCH	100.0%	NA	100.0%	NA	100.0%	100.0%	100.0%
ADELPHOI VILLAGE- ARMSTRONG	#VALUE!	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!
BRADFORD AREA CHRST ACADEMY	#VALUE!	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!
BRISTOL JSHS	#VALUE!	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!
CENT PA DIGITAL LEARNING CS	#VALUE!	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!
CHILDREN'S HOME READING	#VALUE!	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!

In the same way that we see a deterioration of proficiencies in the lower end of the spectrum, we also see it here at the upper end where only three schools are shown with proficiencies above 82.5%. In the 4th grade table there were eighteen such schools displayed. As before, we think the 100% proficient school shown in the table is probably an incorrect entry due to unknown administrative errors.

Lowest and highest 11th grade results:

In a similar fashion to the foregoing the least proficient high schools are near the top of spreadsheet table in the worksheet, **PA High Schools Ordered.xls.** We show this in Table 6a.

Table 6a. A small portion of the spreadsheet table of Pennsylvania 11th grade proficiency percentages is shown. The trend shown in Table 5a of needing more rows to show the schools possessing proficiencies up 6.1% extends here to even more rows than there.

	Source	Source	Source	Source			
	PSSA	NAEP DE	PSSA	NAEP DE			
Year of testing=	2007	2005	2007	2005	PP designates proficiency %		
School or Tested Group	State Test: Math Proficiency Percentage	NAEP Test: Estimate Math Proficiency Percentage	State Test: Reading Proficiency Percentage	NAEP Test: Estimated Reading Proficiency Percentage	NAEP Consistent ELQ Math Inflation PP	NAEP Consistent ELQ Reading Inflation PP	NAEP Consistent Proficent in Both
StateWide	53.7%	30.0%	65.4%	38.0%	30.0%	38.0%	30.0%
White Demographic Group	59.3%	34.9%	71.7%	41.3%	34.5%	44.1%	34.5%
Black Demographic Group	24.6%	8.0%	35.6%	19.5%	11.2%	16.2%	11.2%
Hispanic Demographic Group	27.7%	9.3%	36.2%	19.4%	12.9%	16.6%	12.9%
Asian Etc. Demographic Group	77.1%	57.1%	72.1%	77.3%	51.7%	44.5%	44.5%
Female Demographic Group	53.2%	26.3%	69.7%	40.6%	29.6%	42.1%	29.6%
Male Demographic Group	54.3%	33.6%	61.3%	35.4%	30.5%	34.4%	30.5%
HOPE CS	0.0%	NA	3.0%	NA	0.0%	1.0%	0.0%
CAREER TECHNOLOGY ACADEMY	1.3%	NA	12.0%	NA	0.5%	4.5%	0.5%
BUEHRLE ALTERNATIVE	1.6%	NA	8.1%	NA	0.6%	2.9%	0.6%
COMMUNICATIONS TECHNOLOGY HS	2.9%	NA	18.7%	NA	1.1%	7.4%	1.1%
UNIVERSITY CITY HS	3.1%	NA	11.7%	NA	1.2%	4.4%	1.2%
CARROLL CHARLES SCH	15.3%	NA	3.8%	NA	6.5%	1.3%	1.3%
CHESTER HS	3.4%	NA	9.9%	NA	1.3%	3.6%	1.3%
KENSINGTON CREATIVE & PERF ART	3.6%	NA	11.3%	NA	1.4%	4.2%	1.4%
NEW MEDIA TECHNOLOGY CS	4.1%	NA	20.3%	NA	1.6%	8.2%	1.6%
FITZSIMONS THOMAS ACADEMY	5.1%	NA	5.1%	NA	2.0%	1.8%	1.8%
WEST PHILADELPHIA HS	5.5%	NA	6.2%	NA	2.2%	2.2%	2.2%
ACADEMY CHARTER SCHOOL	5.9%	NA	11.8%	NA	2.3%	4.4%	2.3%
FRANKLIN BENJAMIN HS	10.4%	NA	7.1%	NA	4.3%	2.5%	2.5%
KEYSTONE ED CTR CS	6.0%	NA	18.0%	NA	2.4%	7.1%	2.4%
JOHN BARTRAM HS	6.4%	NA	8.4%	NA	2.5%	3.0%	2.5%
ROOSEVELT ALTERN SCH	12.5%	NA	7.7%	NA	5.2%	2.8%	2.8%
RHODES E. W. ACADEMY	6.6%	NA	21.1%	NA	2.6%	8.5%	2.6%
DUQUESNE HS	6.7%	NA	37.5%	NA	2.7%	17.4%	2.7%
PERSEUS HOUSE CS OF EXCELLENCE	7.5%	NA	15.0%	NA	3.0%	5.8%	3.0%
SAYRE WILLIAM L MS	7.6%	NA	22.0%	NA	3.0%	9.0%	3.0%
HARRISBURG HS	8.2%	NA	21.5%	NA	3.3%	8.7%	3.3%
GERMANTOWN HS	8.4%	NA	14.3%	NA	3.4%	5.5%	3.4%
PENN WILLIAM HS	8.4%	NA	14.5%	NA	3.4%	5.5%	3.4%
MARITIME ACADEMY CS	8.8%	NA	45.5%	NA	3.6%	22.5%	3.6%
LAWRENCE CO AVTS	9.0%	NA	23.0%	NA	3.6%	9.5%	3.6%
KING MARTIN LUTHER HS	9.2%	NA	13.8%	NA	3.7%	5.2%	3.7%
DOUGLAS STEPHEN A SCH	11.1%	NA	11.1%	NA	4.6%	4.1%	4.1%
EDISON/ FAREIRA HS	9.6%	NA	13.2%	NA	3.9%	5.0%	3.9%
OLNEY HS WEST-704	13.4%	NA	11.7%	NA	5.6%	4.4%	4.4%
COLLEGIUM CS	10.0%	NA	30.0%	NA	4.1%	13.1%	4.1%
IMHOTEP INSTITUTE CS	10.6%	NA	37.1%	NA	4.4%	17.1%	4.4%
WESTERN CTR FOR TECH	10.6%	NA	25.0%	NA	4.4%	10.5%	4.4%
ACHIEVEMENT HOUSE CS	10.8%	NA	32.3%	NA	4.4%	14.3%	4.4%
KENSINGTON CULINARY ARTS	23.4%	NA	12.8%	NA	10.6%	4.8%	4.8%
SOUTH PHILADELPHIA HS	19.9%	NA	12.9%	NA	8.8%	4.9%	4.9%
PEABODY HS	11.3%	NA	23.5%	NA	4.7%	9.7%	4.7%
FRANKFORD HS	11.5%	NA	15.7%	NA	4.8%	6.1%	4.8%
TUSCARORA BLENDED LEARNING CS	12.2%	NA	32.5%	NA	5.1%	14.5%	5.1%
OLNEY HS EAST-705	17.3%	NA	14.5%	NA	7.5%	5.5%	5.5%
DOBBINS MURRELL AVTS	12.6%	NA	21.7%	NA	5.3%	8.8%	5.3%
PA LEARNERS ONLINE CS	12.7%	NA	42.8%	NA	5.3%	20.7%	5.3%
CENT PA DIGITAL LEARNING CS	13.0%	NA	30.4%	NA	5.4%	13.3%	5.4%
COMM ACAD OF PHILA CS	13.0%	NA	19.2%	NA	5.4%	7.6%	5.4%
OLIVER HS	13.0%	NA	27.2%	NA	5.4%	11.6%	5.4%
NORTHSIDE URBAN PATHWAYS CS	13.1%	NA	31.6%	NA	5.5%	14.0%	5.5%
FELS SAMUEL HS	18.0%	NA	15.4%	NA	7.8%	5.9%	5.9%
KENSINGTON INTL BUSINESS FINAN	14.4%	NA	15.5%	NA	6.1%	6.0%	6.0%
WESTINGHOUSE HS	13.4%	NA	21.9%	NA	5.6%	8.9%	5.6%
SWENSON HS	13.9%	NA	27.9%	NA	5.8%	12.0%	5.8%
AL-AQSA ISLAMIC SCHOOL	50.0%	NA	16.7%	NA	27.2%	6.5%	6.5%
VAUX ROBERTS HS	15.4%	NA	16.7%	NA	6.6%	6.5%	6.5%
OVERBROOK HS	14.5%	NA	22.9%	NA	6.1%	9.4%	6.1%

Lastly, we show the bottom of this same spreadsheet table where the most proficient high schools are listed.

Table 6b. A small portion of the bottom of the spreadsheet table of Pennsylvania 8th grade proficiency percentages is shown. The rows displayed are near the bottom of the table.

CENTRAL HS	97.2%	NA	97.3%	NA	84.3%	83.7%	83.7%
MASTERMAN JULIA R SCH	97.5%	NA	99.1%	NA	85.2%	90.8%	85.2%
ADELPHOI VILLAGE- ARMSTRONG	#VALUE!	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!
AGORA CYBER CS	#VALUE!	NA	#VALUE!	NA	#VALUE!	#VALUE!	#VALUE!

We see a further shrinkage of the numbers of schools ranked above proficiencies of 82.5% down to just two such institutions.

Highlights of Pennsylvania estimates of public school proficiencies.

As is quite evident, in perusing the results shown in the accompanying spreadsheets, some of the state's worst schools are in Harrisburg and Philadelphia. Its best schools are in scattered rural and suburban locations.

A survey of Pennsylvania public schools' estimated NAEP scores shows that its bottom ten schools at each of the indicated grade levels had less than 4% of its children at or above grade level. One trend evident here is a general degradation over time as children evolve from primary levels to high school. These proficiencies are so low that even when inflated they are still totally unacceptable.

Table 7.

Grade Level	Percent proficient on NAEP	Percent proficient on PSSA
4th	3.5%	11.1%
8th	1.6%	7.8%
11th	1.1%	2.9%

As Table 7 below makes clear, the worst schools not only "fail" on their NAEP estimated proficiencies, but they also have enormous majorities of children below the so-called state determined proficiency levels.

In contrast, many of the better schools that appear to be performing adequately (state determined proficiencies in the 80% range) are, in fact, performing poorly (with NAEP consistent proficiencies really in the 40% to 60% range).

What do these estimates say about student proficiency & testing regimes?

The results in terms of proficiency percentages are shown against the blue backgrounds in the several tables in the accompanying spreadsheets. Our discussion will focus on those students who are proficient in both mathematics and in reading- the latter sometimes called English language arts. Thus, for a student to be accorded the status of proficient, we hold that he or she must be proficient in both reading and mathematics. Likewise, a district or school's proficiency percentage of most importance in our analysis is the percentage of students who are proficient in both, which we optimistically assume to be the minimum of the reading and mathematics proficiency percentages.♠ That number is

♠ The maximum percentage of students who can possibly be proficient in both is the minimum of the two proficiency percentages for math and reading. At the other extreme, it is possible that the number of students who are proficient in both areas could be as small as the sum of the two proficiency percentages minus 100%. This means that it is possible- though quite unlikely- that until the sum of the two proficiencies exceeds 100% one could have 0% proficient in both. Thus we are making a very optimistic assumption in choosing the maximum within this range and therefore our reported proficiency estimates are probably overstating

shown in the rightmost column and is also the number used to establish their ranking, which is also the order in which the results are displayed. Others who are more interested in subject areas might want to study the separate proficiencies for mathematics and reading.

We first look at the national situation but not because it represents a goal. We look at it to understand that the problems seen in Pennsylvania are also seen nationally. One thing evident from the national NAEP proficiency percentages is their decline over the school careers of the tested cohorts- dropping from 32% proficient in 4th grade and 29% in 8th grade to a mere 22% by 12th grade. In Pennsylvania students perform somewhat above the national average in all grade levels. Their proficiencies decline but less rapidly than the national averages- going from 40% to 36% to an estimated 30% as the children go from 4th to 8th to 11th grade. Being this much above average is not necessarily a good thing when in absolute terms more than 60% to 70% of the children lack proficiency and are therefore not performing at grade level.

We also examine performance according to ethnic groups at the statewide level because it provides us an independent measure of the errors in our mapping method. Both NAEP and Pennsylvania's PSSA tests provide this information. It also makes quite clear the very low proficiency percentages for black and Hispanic students, which motivates us to understand why. Are there reasons beyond the usual socio-economic factors involved? Of course, social promotion is involved. Higher percentages of poorly performing students are promoted to levels beyond their skills compared to their counterparts among whites and Asians. One wonders if this is a form of discrimination? Is it, as President Bush famously said, an example of "the soft bigotry of low expectations?"

Early in this report we wondered about the deflation seen in the math proficiencies in Massachusetts. We conjectured that the using significant deflation in 4th grade, then modest deflation in 8th grade, followed by significant inflation in 10th grade could be a method by which actual declining mathematics proficiencies could be made to look as if they were increasing. We dub this practice of using differing amounts of inflation as differential inflation. Pennsylvania does not appear to be employing differential inflation.

Looking for bright spots in these tables is a discouraging process for there are few to be found. It is easier to find severely troubled schools and there are many, particularly in and near Philadelphia. As a district, however, Philadelphia has low average proficiencies of 18.7% in 4th grade, 14.9% in 8th grade, and we estimate 13.9% in 11th grade. This means well over 80% of its children are below grade level and similar percentages have not earned the high school diplomas they've received.

According to our estimates, the worst districts in the state are Harrisburg (lowest 4th grade proficiency of 8.5%), Duquesne City (lowest 8th grade proficiency of 3.2%), and Chester Upland (lowest 11th grade proficiency of around 1.2%).

We should remember that these are not just numbers. These low proficiencies indicate that the vast majority of children in these schools are not receiving anything close to a good education and it means that the system is harming them. While it is not the central focus of this report to discuss precise remedies for these ills, we nevertheless believe that ending social promotion is a key reform that would likely lead to significantly higher proficiencies.

Lastly, are public school authorities misleading their stakeholders when they award high school diplomas to students with sub-par levels of proficiency? In Pennsylvania, with only 30% of its 11th grade students estimated to being proficient, the answer would appear to be "yes." Thus, approximately 70% of its diplomas attest to skills not yet mastered by those receiving them.

Conclusions and Remedies

In this report we have analyzed achievement test scores of public school students in the Commonwealth of Pennsylvania and have done this for every public school and every public school district within the state. Rather than

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the actual situations. So, "yes Virginia," the results shown in our tables, bad as they are, may well and probably do exaggerate the true levels of student competence!

accept state reported proficiency percentages, we have used a reasonably accurate mapping procedure to convert these results into ones consistent with the Nation's Report Card (NAEP examinations). This provides stakeholders with more realistic and yet troubling results. The information we use and the analysis we have applied to it is providing us with a clearer picture of dysfunctional public schools- particularly with regard to the problems of social promotion. It also helps us understand what steps can be taken to begin their reform.

We have not addressed private schools in this report. Nationwide, NAEP reports approximately 45% of such students to be proficient. This suggests that while better than most public schools, America's private schools also suffer from having a majority of their students below grade level and from having far too many graduates lacking 12th grade skills. Again, as we have shown throughout this report, the major cause is believed to be social promotion.

Background Factors

Even if you had not read this report and if you knew nothing else about public schools, the information from the NAEP and from the state administered PSSA examinations tells you something troubling about these institutions:

- By comparing the NAEP scores and the various similar testing regimes used by the states, we learn that most states "inflate" the actual performance levels by practicing a kind of "grade inflation" wherein they place many more children in the proficient or above category than are really deserve that designation. In the case of Pennsylvania, this inflation averages over 80%.

- As we've already mentioned, the large numbers of Pennsylvania students scoring below proficient on the NAEP is a strong indicator that the school systems are conducting large-scale social promotion- usually accompanied by grade inflation.

- Though not discussed here, the *SchoolMatters* website[viii] also presents information about the graduation rates from which we can infer substantial dropout rates- about 30% nationally. It shows Pennsylvania's dropout rate is significantly lower at about 20%.

- Finally, when we define what we call the *high school failure rate* to be the fraction of those entering 9th grade who do not complete 12th grade at a proficient or above level, the statistics available from *SchoolMatters* and NAEP allow one to estimate nationwide *high school failure rates* of approximately 85%. The same analysis for Pennsylvania suggests a 77% *high school failure rate*.

Removing the inflation reveals a harsh reality

The primary emphasis of this report has been two-fold:

- Looking at the statewide situation we have reviewed the concrete evidence showing the substantial inflation in the PSSA reported proficiencies, which have averaged about 80% above the more reliable NAEP reported proficiency percentages.

- Through the use of our ELQ mapping procedure we have made estimates at the school and district levels showing that even the best schools have unacceptably low levels of proficiency, while the worst schools are so bad that they nearly defy description.

Given that the inflated PSSA proficiencies were already quite modest, we have seen that the removal of the inflation literally changes the apparent status of public education in Pennsylvania from bad to worse.

From the NAEP estimates, alone, we learn that most schools in the Commonwealth have a majority of their children performing below grade level. Schools in Pennsylvania where more than half of the children perform at or above grade level are rare:

- 33% of schools at 4th grade,
- 16% of schools at 8th grade, and
- 6% of schools at 11th grade, reach this modest performance level.

Limitations to this analysis

Some of the difficulties and errors in our analysis have been discussed above. We reiterate that:

- The ELQ mapping method is based on five assumptions that are plausible but not rigorously proven.
- Measured and estimated errors in our analysis suggest that our calculated proficiencies at the 4th and 8th grade levels are generally accurate to within 5% on the proficiency percentage scale. In 11th grade our accuracy is less- around 10%.
- The extrapolation of statewide NAEP proficiencies to the 11th grade level assumes a linear relationship that is also unproven.
- The large discrepancy seen in 11th grade Asian reading proficiencies restricts the applicability of our analysis.
- We also see some evidence of erroneous PSSA results in the fact that a statistically unlikely and relatively large number of schools reported 100% of their 4th grade pupils as proficient in both subjects- significantly higher than for those reporting PSSA proficiencies in the mid to high 90% range and certainly at odds with a normal probability distribution. There were 9 such schools out of a total 1764 schools that tested 4th grade pupils. For one of them, 100.1% were reported proficient!

We seek a better method for estimating NAEP-like proficiencies in the high school years, but are not currently aware how that can be done better than what we have produced here. When such techniques are made known to us or developed by us we will use them.

Who or what is responsible for the problems and what are some remedies?

Some of the public school practices mentioned in this report seem to be unethical in a number of contexts, including:

- The inflation of the performance ratings of public school students is a form of false advertising.
- That, in turn, can harm children by luring their parents into enrolling them into seemingly adequate schools that are in fact significantly sub-par. Is this not a form of unintended child abuse?
- Social promotion neglects children who fall behind.
- Awarding counterfeit diplomas leads to the need for major remedial education programs in colleges, which damages these institutions and hinders their ability to offer more college level instruction (within any given budget).

On this latter point, I have heard of parents who have successfully sued public school districts over the issue of their children's subsequent need for remedial instruction. (I've been told that this has happened in Orange County, California.)

When faced with this kind of evidence that shows how poorly our public schools perform, it is tempting to blame the problems on corruption and mismanagement. Depending on one's philosophy regarding education, economics, public policy, and politics, there are surely a number of explanations to be offered as to why these public schools (and often private schools) perform so poorly.

Technically they are not corrupt

If public schools were private profit making institutions, awarding false diplomas would be a clear case of fraud. In that imagined environment, some parents and students would take legal action against schools awarding such counterfeit certificates. Competition within that marketplace would put the squeeze on such businesses and they would soon improve or go out of business.

But public schools are not for-profit and they are not private. Our political process gives them wide latitude to operate outside of what would be considered good business practices. And in such an environment it is not clear that these organizations are corrupt because that has the implication of illegal activities. Rather, over time, our laws and bureaucratic regulations have formalized their operating procedures and thus regarding their activities as illegal is probably not a valid approach. Still, it is probably fair to say that our educational establishment has legalized activities that would be illegal in other market sectors.

Mismanagement is not the essential problem

If our public schools' problems are not due to illegal and corrupt activities, the next question asks if their many problems are due to mismanagement?

If so then it would seem that the public schools' problems would stem from poor management of an otherwise correct and enlightened policy. It might suggest that the replacement and or redirection of management would solve the problems. Such reforms improve the schools but not significantly.

If the problems are not due to mismanagement then we are left with the inference that the managers are doing a good job implementing policies and yet the results are bad. Excluding this and the previous alternative suggests that the policies are bad.

As in any bureaucratic organization, there will be management problems. Within a government bureaucracy, such as in a school district, these problems will probably be more severe than those found in business organizations. Yet, we have seen many school systems that have technically adept bureaucrats in charge who do a good job of implementing the policies they are given to enforce.

We conclude that while school management is often a problem, we believe that it is not the primary problem facing the schools.

Policies are to blame

We are brought to the conclusion that our public schools are failing because they operate under a failed and dysfunctional set of policies. The most obvious policy mistake laid bare by the achievement test results is clearly that of social promotion. Some might want to argue that it is poor instruction, or poor demographics, or poorly compensated staffs, but those are what the lawyers would call proximate causes. Take away social promotion and the policy must become one of limiting courses/grade levels to those who are proficient or nearly so. It also would limit the awarding of diplomas to only those who have become proficient at the 12^{th} grade level.

Taking away social promotion would restore integrity to public schools. It would end the deception of parents, students, and other stakeholders that is currently the accepted practice.

Do we focus on the low end or on all public schools?

The nature of the results we have obtained presents a dilemma as to how remedies might be structured to address the problems that were found.

Should remedies be focused on the worst performing schools or do we focus on all schools? We think the latter choice makes more sense because our results show that all schools are suffering, albeit in various degrees, from the low proficiencies and for essentially the same reason: social promotion.

Ending social promotion is difficult in an age based grade level system

In the context of a school using a grade level system, we believe that ending social promotion can improve proficiency levels to above 90%- and it would have at least one other important consequence: larger numbers of older children would end up retained into lower grades. That may at first seem like an unacceptable side effect. But upon further consideration, the high levels of retention would provide needed feedback to stakeholders that further reforms- say,

regarding instruction- need to be undertaken. It would shine a bright light on our troubled schools and that may, in turn, induce action. That would be better than the current situation.

On this point, we understand that the public education system in India has a fairly strict system based on grade level exit examinations that largely prevents social promotion. Many children are forced to repeat grade levels. Yet, this seems somewhat on the draconian side when a child's deficiencies may be only in a few subject areas and where they may not be an entire year behind. We believe there are better ways to overcome social promotion.

Replacing age based grade levels with a self-pacing format

We believe that social promotion can be eliminated by employing a redesigned instructional system. We propose using online, self-paced instruction that would have higher quality content while at the same time trimming costs. This would prevent social promotion by removing the concept of age based grade levels. A child's academic placement, in the new regime, would be strictly a function of what courses they have mastered. Retention, in such a system, is effectively replaced by having a child work at a slower pace or by having the child spend more time per week on a difficult subject.

This is not a new concept. In the adult world we are all accustomed to professions that require certifications- such as CPA. No one asks an accountant for his or her age when they are considered for the designation of CPA. Rather they must pass a skills based test. Similarly, at the YMCA the swimming achievement levels have nothing to do with a child's age. Rather they depend on the child's demonstrated skills.

Who bears the responsibility for the problem and for the remedies?

The intention of this report is not to place blame yet we think it helpful to cite those individuals and institutions that share responsibility for the current situation. Among those responsible are:

- Parents
- Voters
- School Boards
- Educators
- Media
- Teacher's Unions
- Teachers

It is likely that most of these individuals and groups are not aware of the troubling situation being faced in K-12 education. For the most part, when these "parties" come to possess better information about pupil proficiencies, we think they will seek remedies. If social promotion is as harmful as we believe, most of these people will seek solutions.

We offer this report as a component of that "better information."

Endnotes:

[i] Please see the glossary at http://www.schoolmatters.com/app/glossary/q/stid=40/lt=N

[ii] The information from the Pennsylvania System of School Assessment (PSSA) was found at: http://www.pde.state.pa.us/a_and_t/cwp/view.asp?A=3&Q=129181

[iii] The NAEP data can be obtained directly from the NCES website at http://nces.ed.gov/nationsreportcard/nde/

[iv] Found in *Mapping 2005 State Proficiency Standards Onto the NAEP Scales*, Research and Development Report, June 2007, U.S. Department of Education, Institute of Education Sciences, NCES2007-482. Report is downloadable from http://nces.ed.gov/nationsreportcard/pubs/studies/2007482.asp .

[v] A rather detailed presentation of the derivation of the ELQ formula and other interpolation methods can be found in the downloadable Word document *MapToNAEP.doc* which is available on the author's website at http://www.asoraeducation.com/page35/page40/page40.html .

[vi] We found population and socio-economic information about Asians within Pennsylvania and the United States at the U.S. Census Bureau's website: http://www.census.gov/Press-Release/www/2001/sumfile1.html .

[vii] Please see the document *MapToNAEP.doc* of the earlier citation.

[viii] Please visit www.schoolmatters.com for details.