PSC
PUBLIC SECTOR CONSULTANTS

Achievement Exceeding Predicted Proficiency

Methodology

- ***Goal*:** Achievement Exceeding Predicted Proficiency (AEPP) is designed to compare student proficiency on standardized tests at the school and district level, across grades, and over time, controlling for socioeconomic status.
- ***Advantages*:** AEPP uses a multiyear approach that helps to level out volatility that may be present in a given year; builds on work by others; uses publicly available data sets; offers a complete school and district-level analysis; and employs a basic methodology that is easily replicable.
- ***Disadvantages*:** It includes any disadvantages of the standardized tests and does not incorporate other factors that can affect performance, such as cultural differences, pre–K education, and neighborhood factors[1].

Many methods can be used to conduct this type of analysis. The goal here is to provide one view of the data so that schools and districts can compare their actual performance to predicted performance, based on the socioeconomic status of their students.

ACHIEVEMENT EXCEEDING PREDICTED PROFICIENCY (AEPP)

In order to accomplish the stated goal, state standardized tests were used from grades 3, 4, 5, 6, 7, 8, 9, and 11 (see table below). Three years of data were included in the overall AEPP ranking to allow a broader view of school performance and account for variations from year to year. The focus was on the number of students within a school who were deemed "proficient" in a given subject. As such, the *percent proficient* was utilized, as opposed to the average test scores for the district (which give no indication of how many/what percentage of students have met the proficiency standard). All test data were available through the Michigan Department of Education (MDE), 2012 MME Downloadable Data Files.[2]

State Standardized Tests, 2011–2014

	Grade	Test	Subject	Test date
Elementary School	Third	MEAP	Math	Fall 2011–2013
	Third	MEAP	Reading	Fall 2011–2013
	Fourth	MEAP	Math	Fall 2011–2013
	Fourth	MEAP	Reading	Fall 2011–2013
	Fourth	MEAP	Writing	Fall 2011–2013
	Fifth	MEAP	Math	Fall 2011–2013

[1] Anja Kurki, Andrea Boyle, and Daniel Aladjem. 2005. *Beyond Free Lunch- Alternative Poverty Measures in Educational Research and Program Evaluation.* American Institutes for Research, Washington, D.C.

[2] Tables used: 2011–2014 MME Proficiency Data File and the 2011–2014 ACT Proficiency Data File. Available at: www.michigan.gov/mde/0,4615,7-140-22709_35150_47475---,00.html; Fall 2012 MEAP Four Year Public Proficiency Data with Chart Data File. Available at: www.michigan.gov/mde/0,4615,7-140-22709_31168_31530---,00.html; 2010–2013 Free and Reduced Lunch Counts. Available at: https://www.mischooldata.org/Other/DataFiles/StudentCounts/HistoricalFreeAndReducedLunchCounts.aspx

	Grade	Test	Subject	Test date
	Fifth	MEAP	Reading	Fall 2011–2013
	Fifth	MEAP	Science	Fall 2011–2013
Middle School	Sixth	MEAP	Math	Fall 2011–2013
	Sixth	MEAP	Reading	Fall 2011–2013
	Sixth	MEAP	Social studies	Fall 2011–2013
	Seventh	MEAP	Math	Fall 2011–2013
	Seventh	MEAP	Reading	Fall 2011–2013
	Seventh	MEAP	Writing	Fall 2011–2013
	Eighth	MEAP	Math	Fall 2011–2013
	Eighth	MEAP	Reading	Fall 2011–2013
	Eighth	MEAP	Science	Fall 2011–2013
High School	Ninth	MEAP	Social studies	Fall 2011–2013
	Eleventh	MME	Math	Spring 2011–2014
	Eleventh	MME	Reading	Spring 2011–2014
	Eleventh	MME	Writing	Spring 2011–2014
	Eleventh	MME	Science	Spring 2011–2014
	Eleventh	MME	Social studies	Spring 2011–2014
	Eleventh[a]	ACT	All subjects	Spring 2011–2014

[a] The ACT can also be taken in the 10th or 12th grade.

Based on the available data and the review of peer-reviewed literature, this analysis utilizes the percentage of students eligible for free or reduced price lunch as the socioeconomic indicator and utilizes an ordinary least squares (OLS) regression analysis to predict the percentage of students projected to be proficient for a particular grade/test. The AEPP is in part based on previous work by the University of Arkansas, in which the actual performance of a school on a particular test in a particular grade is compared to its projected performance, given the socioeconomic status of the school or community.[3] The total number of free and reduced priced lunch students is variable most often used by researchers, particularly those relying on secondary data, as an indicator of student socioeconomic status.[4,5,6,7] Similar to a Mackinac Center study, the socioeconomic indicator of a school (using free and reduced priced lunch, in this case) was the only independent variable in the regression analysis.[8] The socioeconomic indicator is as follows:

$$\frac{Number\ of\ students\ Eligible\ for\ Free\ OR\ Reduced\ Priced\ Lunch}{Total\ number\ of\ students} * 100$$

[3] Jay P. Greene, et al. 2006. *The School Performance Index in Arkansas*, Department of Education Reform. University of Arkansas. Available at: www.uark.edu/ua/der/Research/SPI/SPI_Full_Document.pdf (accessed January 20, 2013).
[4] The Center for Educational Performance and Information (CEPI). Fall 2011. District-Level Free and Reduced-Price Lunch Counts.
[5] Bruce D. Baker. July 18, 2013. *A Poverty of Thinking about Poverty Measures in New Jersey School Finance. New Jersey Education Policy Forum.* Rutgers University Graduate School of Education.
[6] Kurki, Boyle, and Aladjem. 2005.
[7] Selcuk R. Sirin. 2005. Socioeconomic Status and Academic Achievement: A Meta-Analytic Review of Research, *Review of Educational Research.* Fall 2005. Vol 75:3, p. 417–453.
[8] Michael Van Beek, et al. 2012. *The Michigan Public High School Context and Performance Report Card*. The Mackinac Center for Public Policy. Available at: www.mackinac.org/17256 (accessed December,15 2012).

Following this formula, schools in which all students are eligible for free or reduced priced lunch would have a socioeconomic indicator score of 100 and a district in which no students are eligible for either free or reduced price lunch would have a socioeconomic indicator score of 0.

The percent proficient also was adjusted for each district/grade/test by the statewide mean and standard deviation for the given grade/test, to normalize the distributions to a mean of 100 and a standard deviation of 15.

$$Adjusted\ Percent\ Proficient = 100 + 15(\frac{Percent\ Proficient - Calclulated\ State\ Mean}{Calculated\ State\ Standard\ Deviation})$$

The calculated state mean and calculated state standard deviation used for each test were calculated based on all available percent proficiencies reported for the given test. All schools, including those with incomplete data, were used in this calculation. This adjusted percent proficiency (APP) was then utilized as the dependent variable in the OLS regression, using the socioeconomic indicator of free and reduced price lunch as the independent variable to predict the projected percent proficient (PPP). A district's APP is then compared to the PPP and adjusted so that a school that performs exactly as projected would score a building level year X–AEPP of 100.

$$Year\ X - AEPP = \frac{APP}{PPP} * 100$$

If a school performs above its projected level, its year X–AEPP would be above 100, and if it performs below its projected level, its year X–AEPP would be below 100. This does not mean that schools with a AEPP below 100 have a low percentage of students meeting the proficiency standards. What it does mean is that relative to how well the students are *projected* to perform, given the socioeconomic status of the student population, the district's students are not meeting expectations. For example, if 90 percent of a school's students are proficient on all tests, but the district is projected to have 95 percent of students proficient on all tests, the school's AEPP would be 94.74. Obviously, this school would be considered very successful based on the standard performance measures, but once socioeconomics are taken into account, it is underperforming compared to expectations.

The year AEPPs for elementary, middle, and high school are a composite of test scores. To ensure that the grade 4 tests, for example, are not given more importance because of the quantity of tests from that grade, a year X–AEPP is first calculated for each grade level (grade 3 year X–AEPP, grade 4 year X–AEPP, and grade 5 year X–AEPP for our elementary AEPP). These grade-level year X–AEPPs are then averaged together for a elementary, middle, and high school year score year X–AEPP, giving equal weight to performance at each grade level, not equal weight to each test.

The three-year AEPP for elementary, middle, and high school is an average of the most recent three years of available data, from fall 2011 to spring 2014.

$$3\ Year\ AEPP = (AEPP\ 2013 + AEPP\ 2012 + AEPP\ 2011)/3$$

A school will only have an elementary, middle school or high school AEPP if it has scores reported for all targeted grades. For example, only those schools that reported scores for the 2013–2014 school year in all targeted grades (6, 7, 8) have a middle school AEPP for 2014. Schools with fewer than a full complement of test scores were utilized in the calculations to determine AEPP scores and may have individual grade-

level AEPPs, but were not included in any rankings. The reason for their exclusion from the overall ranking, as well as exclusion from grade-level rankings, goes back to the goal of viewing a district's performance across all grade levels (elementary, middle, and high school) and the concern about unequal comparisons with schools that specialize in a particular level.

Only schools that have a full three years of data reported are included in the three-year AEPPs. While this may exclude a few newer schools, overall I excluded relatively few schools. Their tests scores were used in the analysis, but they are not included in the overall rankings. Again, the rationale for excluding these schools is to avoid unequal comparisons between established and emerging schools.

District-level AEPPs are created by utilizing the school-level analysis. Each test for each grade, subject, and year were weighted based on the number of students who took that particular test in that grade, subject and year and aggregated at the district level by individual grade, subject, and year. These district-level scores were then averaged to obtain the grade, elementary, middle, and high school AEPPs for each year and the three-year average.

The AEPP allows for a comparison of schools in Michigan while controlling for a key driver of student success—socioeconomic status. Several highly ranked schools are very low-income schools that appear to perform poorly when looking only at the percentage of students found proficient. These schools may, in fact, be over-performing in terms of how we would expect them to perform given their socioeconomic status. The AEPP allows us to view each district relative to *itself*, so schools can see how they are internally performing, given what is projected.

This is only one model of projected performance out of many and is intended to begin an open dialogue on how we view school and student performance.