

# Achievement Exceeding Predicted Proficiency

## *Methodology in Brief*

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- **Goal:** Achievement Exceeding Predicted Proficiency (AEPP) is designed to compare student proficiency on standardized tests at the school district level, across grades, and over time, relative to socioeconomic status.
- **Advantages:** AEPP uses a multi-year 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 district-level analysis; and employs basic methodology that is easily replicable.
- **Disadvantages:** No K–8 districts are included in overall AEPP; only districts with three years of data are included in overall AEPP. It includes any disadvantages of the standardized tests and does not incorporate other factors that can affect performance, such as cultural differences and pre-K education.

Many methods can be used to conduct this type of analysis. The goal here is to provide one view of the data so that 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 4, 8, and 11 to represent elementary, middle, and high school performance (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 district 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.<sup>1</sup>

State Standardized Tests, 2011–2013

Grade	Test	Subject	Test date
Fourth	MEAP	Writing	Fall 2010–2012
Fourth	MEAP	Reading	Fall 2010–2012
Fourth	MEAP	Math	Fall 2010–2012
Eighth <sup>#</sup>	MEAP	Reading	Fall 2010–2012
Eighth	MEAP	Math	Fall 2010–2012

<sup>1</sup> Tables used: 2010–2013 MME Proficiency Data File and the 2010–2013 ACT Proficiency Data File. Available at [www.michigan.gov/mde/0,4615,7-140-22709\\_35150\\_47475---,00.html](http://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](http://www.michigan.gov/mde/0,4615,7-140-22709_31168_31530---,00.html); 2010–2013 Free and Reduced Lunch Counts. Available at [www.michigan.gov/cepi/0,4546,7-113-21423\\_30451\\_36965---,00.html](http://www.michigan.gov/cepi/0,4546,7-113-21423_30451_36965---,00.html).

Grade	Test	Subject	Test date
11th	MME	Science	Spring 2011–2013
11th	MME	Reading	Spring 2011–2013
11th	MME	Math	Spring 2011–2013
11th	MME	Social studies	Spring 2011–2013
11th	MME	Writing	Spring 2011–2013
11th <sup>a</sup>	ACT	All subjects	Spring 2011–2013

<sup>a</sup> The ACT can also be taken in the 10<sup>th</sup> or 12<sup>th</sup> grade.

<sup>#</sup> Due to data performance errors in the estimation of predicted proficiency for eighth grade science, the science percent proficient was excluded from the current analysis for all years.

The AEPP is based on previous work by the University of Arkansas,<sup>2</sup> along with the modification made by the Mackinac Center for Public Policy,<sup>3</sup> 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. The Arkansas study included test scores across multiple grades, while the Mackinac Center study focused only on high school. Both of these studies looked at the individual school level for comparisons, while the focus of this analysis is at the district level in order to analyze performance in grades K–12 more holistically.

Building off the Arkansas study, an ordinary least squares (OLS) regression analysis was used to predict the percentage of students projected to be proficient for each grade/test. As with the Mackinac Center study, the number of students eligible for free or reduced price lunch<sup>4</sup> was used as the indicator of socioeconomic status and was the only independent variable in the regression analysis. A weighted approach also was utilized, which applies greater weight to those eligible for free lunches (EFL) compared to those eligible for reduced price lunches (ERPL). The formula is as follows:

$$\frac{(\text{Number of students EFL} * 2) + (\text{Number of students ERPL} * 1)}{\text{Total number of students}} * 100$$

Following this formula, school districts in which all students are eligible for free lunch would have a Socioeconomic Indicator score of 200; a district in which all students are eligible for reduced price 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.

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

<sup>2</sup> 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](http://www.uark.edu/ua/der/Research/SPI/SPI_Full_Document.pdf) (accessed, January 2013).

<sup>3</sup> 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](http://www.mackinac.org/17256) (accessed September 2012).

<sup>4</sup> Fall 2011 District-Level Free and Reduced-Price Lunch Counts. The Center for Educational Performance and Information (CEPI).

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 districts, 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 district that performs exactly as projected would score a year X-AEPP of 100.

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

If a district 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 districts 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 district's students are proficient on all tests, but the district is projected to have 95 percent of students proficient on all tests, the district's AEPP would be 94.74. Obviously, this district would be considered very successful.

The school year AEPP is a composite of test scores for grades 4, 8, and 11. To ensure that the 11th grade 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 4 Year X-AEPP, grade 8 Year X-AEPP, and grade 11 Year X-AEPP). These grade-level Year X-AEPPs, representing elementary, middle, and high school performance, are then averaged together for a school year score Year X-AEPP, giving equal weight to performance at each grade level, not equal weight to each test.<sup>5</sup>

The 3-Year AEPP is an average of the most recent three years of available data, from fall 2010 to spring of 2013. Three-year averages for each grade level also were calculated.

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

A district only will have an overall school year AEPP if it has scores reported for all three targeted grades (fourth, eighth, and 11th). For example, only those school districts that reported scores for the 2012–2013 school year in all three targeted grades have an overall Year 2013–AEPP score (a total of 561 school districts). School districts with fewer than a full complement of 12 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 or overall AEPP score.<sup>6</sup> 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 through high school) and the concern about unequal comparisons with districts that specialize in a particular level (such as elementary or high school only).

Only districts that have data reported in the 2012–2013 school year, as well as have a full three years of data, are included in the 3-Year AEPP. While this may exclude a few newer districts, this represents

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<sup>5</sup> For example, if six tests were available from 11th grade and only three tests for fourth and two tests for eighth, applying equal weight to each individual test would give more weight to 11th-grade tests than fourth- or eighth-grade tests, which would be counter-productive to our purposes.

<sup>6</sup> Grade-level Year 2013–AEPP scores for schools without a full complement of tests by identified grades present in the district are available for individuals to review and identify where a particular district would fall, in comparison to others.

relatively few schools.<sup>7</sup> Their tests scores were used in the analysis, but they are not included in the overall rankings. Again, the rational for excluding these districts is in regard to unequal comparisons between established and emerging school districts. 3 Year Grade Level AEPPs were calculated based on the average of the past three years of grade level data, similar to the overall 3 Year AEPP.

The AEPP allows for a comparison of school districts in Michigan that removes the volatility created by a key driver of student success—socioeconomic status. Several districts ranked highly are very low- income districts that appear to perform poorly when looking only at the percentage of students found proficient, but these districts 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 *themselves*, so districts 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.

For additional information on how calculations were performed and verified, including calculated means, standard deviations and equations, please contact Public Sector Consultants at (517) 484-4954.

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<sup>7</sup> Only 21 school districts with data in 2012–2013 do not have a full three years of data, 11 of which are charter schools and 10 of which are traditional school districts (including the Educational Achievement Authority).