

The Coalition for Excellence in Science and Math Education's Method for Improving School performance

For more than 30 years (since [Nation at Risk](#) in 1983), the federal government and most states have been attempting to improve educational performance of students with billions of dollars invested nationally and at state levels for various programs. The results have been abysmal when comparing student achievement on an international scale using such measurement systems as [TIMSS](#) or nationally using such measurement systems as [NAEP](#). There has been some small improvement noted in some states, and there are states that have been performing relatively well all along. But there is very little to show for the money and resources expended.

The unfortunate thing is that when we look at international comparison measures, the US is not doing so well. A lot of time, effort, and money have been spent with very little to show for it. When we look at various states, we find that there are some activities that may tend to improve student performance in some states, but when applied to New Mexico, these rarely, if ever, work out with any reasonable degree of success.

So the Coalition for Excellence in Science and Math Education (CESE) decided some time ago to look at improving education from a slightly different approach. Currently, we have the No Child Left Behind (NCLB) federal statute that forces states who accept the attached money to show performance improvement on an annual basis through 2014, when all students were required to be “proficient,” where the meaning of “proficient” is set by the state. Meeting “Annual Yearly Progress” (AYP) was the goal. There is more complexity than this, but this is the gist of the requirements. This progress and specific testing details were left to the participating states. Much can be said about this statute and the concept, but suffice is to say for this introduction that nowhere does the statute say **how** states are supposed to actually cause improvement to happen. Instead, states are supposed to create criterion-referenced tests and chart the progress of its students against a set of educational standards on a subject-by-subject basis. As it turns out, the only two subjects that really count for NCLB purposes are reading and mathematics.

As a result, we have some idea how the students are performing, though standards and tests may vary significantly from one state to another. Also we can chart how a state says it is performing against the more thorough and universal test taken every two years—the National Assessment of Educational Progress (NAEP). We see a number of states that say they are doing well, while their national NAEP scores say they are not. And we find that other states, like New Mexico, have been fairly honest in setting their standards and tests by looking at a side-by-side comparison to NAEP results, which have been favorable for New Mexico. Still, no matter how we compare to the NAEP results, there ***is no set of guidelines provided on how to improve overall performance.***

However, CESE has derived a methodology based on a well tested mathematically technical method called *canonical correlation* to tell us how well a school or student is performing compared to the state standards based on demographics of the schools. We can use canonical correlation to calculate a demographically predicted trend line (or regression line for the mathematicians reading this). With this trend line we predict tested performance for schools, and

then we compare actual test scores to the predicted score. This is a simple subtraction. The result is called a *residual*. If the residual is positive and very large, (mathematically—significantly above what is predicted), then we may have a school that can be used as a model school for others *in a similar demographic range* to pass on best practices to lower performing schools. This technique provides a way to improve performance. ***This technique provides a way to improve overall performance.***

We present this canonical correlation based method in the following briefing. We also comment about different aspects of what is happening in New Mexico’s public schools today; and we show how schools can be selected for different demographic ranges so that we are actually addressing the schools’ problems, and not another, very different school’s problem.

We caution that this is not a simple process. One cannot simply identify a school that is significantly outperforming, send a teacher or assistant principal in for a day, and learn all the secrets to success. Instead, it will take trained observers who have expertise in teaching, administration, and systems analysis, at a minimum; and it will take them time to identify the best practices.

The payoff, however, is potentially enormous. We are not just talking about sending a school district a list of schools that need to improve and a two week trip to learn the latest silver bullet approach. No, far from it. We are talking about sending a district ways to improve based on New Mexico data from schools similar to theirs that have found those “special things” that can actually improve student achievement despite their lot in life.

This has been a significant undertaking to derive. To see this methodology not used would be disheartening. So please read this brief description and consider that it is not just another way to measure where a school is currently performing, but rather it is a way to tell schools how to reach what we already know are top performance levels. No school is incapable of performing at a high level in New Mexico. The data already show that.