NEW ANSWERS TO OLD QUESTIONS:
USING BIG DATA TO PREDICT AND IMPROVE STUDENT SUCCESS

James S. Lanich, Ph.D., President and CEO, Educational Results Partnership
Darvin M. Winick, Ph.D., Director, Institute for Productivity in Education

Q:

Does more money make public schools more effective? Why do some schools succeed while other similar schools fail? Why are educational reforms frequently promoted, tried and quietly abandoned? Do factors beyond educators' control actually determine school quality?
For those with a vested interest and knowledge of public education, these may be common questions. However, more elusive are the answers.

A:

The usual stated reasons:

1. Public education is too large and diverse to describe by numbers: Success is as much "a feeling" as a quantifiable result.

2. Definitions of a "good school" depend on whom you ask. Parents, educators, public officials and taxpayers answer based on their own interests. Real effectiveness -- student success in a productive system -- may be overlooked.

3. Success, defined by test scores, is a function of standards set by subjective opinions and political necessities. Standards are rarely tied to student success beyond graduation.

4. Educators have limited impact on effectiveness because variations, such as funding and student demographics, produce results that are not comparable across schools and beyond a school's control.

While there is some logic behind each answer, it's not the real story.

The conclusion that public school effectiveness is beyond a school's control is dangerous. It unfairly diminishes the value of school leadership, questions the value of quality teachers, reduces the need for public support, and limits the ability to recognize teachers and administrators who do produce student success.

To explore what is really happening in our schools, we must change the conversation and ask different questions:

Q:

Is difficulty in obtaining agreement on school performance really caused by student and school characteristics that cannot be controlled, or is it a function of inadequate analysis? Could bigger, better and more robust analyses sort through the many variables that may influence school performance? Can "big data" analytics help overcome the current confusion? Can we establish an acceptable definition of school effectiveness, develop a consistent set of predictive measures and compile data sets large enough to make system-wide analyses possible?

The answer is a resounding "Yes." Let's see how.

A:

Definition of School Effectiveness. Organizational theory suggests that success of any activity is best defined by the final outcomes expected. After 12 or more years in preparation, all high school graduates should be prepared to successfully pursue additional training or education, participate in community affairs and succeed in a financially satisfactory career. Current economics suggest success considerations include completion of post-secondary educational programs as well as successful entry into the labor force. Student success beyond graduation, with an effective use of resources, is clearly the ultimate goal of our public schools.

Developing Predictive Measures. Performance measures are important as predictors only to the extent that they validly relate to actual post high school success. Possible student success predictors, in addition to achievement test scores, may include performance consistency, attendance, course completion, activity participation, and class ranking. School characteristics that may help predict student outcomes include school location, enrollment, financial resources, personnel compensation, community characteristics, and student and staff demographics and mobility. To develop an accurate set of predictors, many measures over many years and across a wide range of schools must be accumulated and, then, related to each other and to student success. A very large data set is required.

Compiling Large Data Sets. To avoid the costs and complexities of handling large sets of data, existing analyses of school performance tend to be based on snapshots from a single look at one school or one school district. Performance is rarely linked by student from grade-to-grade or across units. Actual costs per student are frequently ignored. Often only selected, easy-to-measure variables are reported. Success beyond public school is rarely considered.

Single, variable snapshots (while easy and inexpensive to produce) make comparisons over time,

among variables and between schools difficult and generalized effectiveness findings impossible. As a practical matter, one-time looks may miss important predictors.

The challenge is obvious. Can a sufficiently large, big picture set of data be accumulated and analyzed to identify school effectiveness?

Enter the Educational Results Partnership. The Educational Results Partnership (ERP) has been set up specifically to answer the "big data" challenge. ERP is an independent, non-profit research group. Primarily directed and funded by business interests and purposefully apolitical, ERP is using modern predictive analytics to identify, quantify and report on public school effectiveness. ERP's work is on-going, results are interesting, and findings are available at no charge to the public.

ERP analyses began in California with the collecting of real data on student performance after high school and then, working backwards, determining what school programs, student accomplishments and/or student or school characteristics predict post school successes. To cover the many possibilities, ERP compiled a massive database, including over a decade of publically available data from all K-12 schools and community colleges in the state. Information was also obtained from California State University and University of California institutions and from workforce reports. Publically available data from other states are currently being added to the database.

Most ERP analyses are quite recent and need replication, but some early results are already attention grabbing. For example, recent results suggest that the effectiveness of public education can be objectively measured, but that differences in per-pupil spending and teacher pay do not accurately predict outcomes.

Schools that repeatedly prepare a higher percentage of students for life after high school than similar schools exist and can be identified, including schools with high minority/low income, hard-to-educate populations.

While success beyond high school can be predicted, test scores alone are not as predictive as more comprehensive combinations of performance measures. Poor college placement decisions based solely on test scores may be a large contributor to lack of success beyond high school. Results also show that effective public schools can be identified, but they appear to be randomly scattered. Differences between schools in very similar circumstances are often large. The seemingly obvious strategy of copying what works in neighboring schools is used infrequently. ERP is changing the paradigm, by expanding beyond California to bring public attention to effectiveness results and to see if focusing on what works will produce change. More results are on the way. We invite you to join us in changing the conversation, and to learn more.

www.edresults.org